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Compounding Ingredients[1]

Compositions—Properties—Functions

VARIOUS chemical ingredients are available for compounding dry rubber and latex to accomplish certain desirable effects. Such are the stabilizers, activators, and retarders of cure; protectors against sun checking or weathering; and special chemicals necessary to successful processing and compounding of latex. Materials for these purposes are specified below.

Addenda—Accelerators

D.O.T.G.

COMPOSITION. Di-ortho-tolylguanidine.
SELLER. American Cyanamid & Chemical Corp.
APPLICATIONS. Heels, soles, footwear, high gravity mechanicals, except white stocks and hard rubber.

D.P.G.

COMPOSITION. Diphenyl guanidine.
SELLER. American Cyanamid & Chemical Corp.
APPLICATIONS. Heels, soles, footwear, mechanicals, and molded goods, except white stocks and hard rubber.

SPDX-A

CHEMICAL COMPOSITION. Lead salt of complex dithiocarbamic acid.
SELLER. The C. P. Hall Co.
APPLICATIONS. Tires and repair materials.
PHYSICAL STATE. Fine brown powder.
PROPERTIES. Sp. gr., about 1.70. Stable. Non-toxic. Discolors white and light colored stocks.
RELEVANT MATERIALS. Activated by zinc oxide, litharge, Phenex, and Captax. Its critical temperature is reduced by Retardex.
PURPOSE AND FUNCTION. Fugitive accelerator more active than SPDX.
METHODS OF USE. Add by master batching.
VULCANIZATION. Adapted to 20 to 35 pounds' curing pressures, 125 to 138° C. (257 to 280° F.)
PATENTS. Not disclosed.

Activators, Organic

165 Acid

CHEMICAL COMPOSITION. Acids of branched and straight chain hydrocarbons. Average molecular weight 175.
SELLER. Alox Chemical Corp.
APPLICATIONS. General compounding.
PHYSICAL STATE. Wine-brown liquid.
PROPERTIES. Sp. gr., approximately 0.95. M. p., -80° F. Stable. Non-toxic. Disperses readily in rubber.
RELEVANT MATERIALS. Most accelerators.
PURPOSE AND FUNCTION. Replaces all or part of stearic acid requirement with 60 to 70% only of the amount.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Promotes curing rate.
PATENTS. Not disclosed.

AA Acid

CHEMICAL COMPOSITION. Hydroxy and ketone acids of about 225 molecular weight, and alcohols and ketones (35%).
SELLER. Alox Chemical Corp.
APPLICATIONS. General compounding.
PHYSICAL STATE. Brown soft solid.
PROPERTIES. Sp. gr., 0.94. M. p., about 45° C. (-49° F.). Soluble in oils and solvents. Stable. Non-toxic. Free of moisture. Disperses readily in rubber.
RELEVANT MATERIALS. Most accelerators.
PURPOSE AND FUNCTION. Replaces stearic acid with additional softening effect.
METHODS OF USE. Add directly to rubber.
VULCANIZATION. Promotes curing rate.
PATENTS. Not disclosed.

Barak

CHEMICAL COMPOSITION. Di-butyl ammonium oleate.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. To activate acidic accelerators.
PHYSICAL STATE. A translucent light-brown liquid.
PROPERTIES. Sp. gr., 0.85 to 0.90. Very stable. Non-toxic. Does not affect color or impart any odor to rubber. Disperses readily.
RELEVANT MATERIALS. Recommended amount 1% on rubber. When 1% of Barak is added, the amount of acidic accelerators can be reduced 25%.
PURPOSE AND FUNCTION. Has a mild accelerating effect and activates accclerators like Thionex, Acrin, and Captax. Assists in the dispersion of carbon black and fillers.
METHODS OF USE. Add directly to the rubber. Stearic acid not required in Barak stocks.
VULCANIZATION. It prolongs the range of cure and tends to prevent reversion on over-cures.
PATENTS. U. S. No. 1,940,280.

M.O.D.X.

CHEMICAL COMPOSITION. Mixture of organic and inorganic acetates.

[1] Continued from INDIA RUBBER WORLD, Mar. 1, 1935, pp. 31-34.

SELLER. The C. P. Hall Co.
APPLICATIONS. Specifically used as activator for Phenex in vulcanization of low-grade rubbers.
PHYSICAL STATE. Coarse cream colored powder.
PROPERTIES. Sp. gr., 1.25. Melting point not definite; begins to melt at about 60° C. (140° F.). Stable. Non-toxic. Disperses readily.
PURPOSE AND FUNCTION. Decreases variability in curing properties of rubber. Increases tensile strength and modulus. Activates many accelerators. Is mildly anti-aging.
METHODS OF USE. Add directly to rubber and handle as usual.
VULCANIZATION. Activator of cure.
PATENTS. Not disclosed.

Tonox

CHEMICAL COMPOSITION. Not disclosed.
SELLER. Naugatuck Chemical.
APPLICATIONS. Tires, tubes, soles, heels, belting, hose, cables.
PHYSICAL STATE. Dark brown solid in lumps.
PROPERTIES. Sp. gr., 1.11. M. p., 60 to 80° C. (140 to 176° F.). Soluble in boiling water. Stable. Non-toxic. Aromatic odor. Discolors white and light colored rubbers. Stiffens uncured black stocks. Disperses readily.
PURPOSE AND FUNCTION. Improves resistance to abrasion and heat. Good antioxidant properties. Retards appearance on the surface of rubber goods of a special type of bloom called "frosting" due not to excess sulphur, but usually to acidic accelerators.
METHODS OF USE. Add directly to rubber. No special handling required.
VULCANIZATION. Appreciable activating effect with most accelerators, and ratios must be adjusted.
PATENTS. Not disclosed.

Antisun Materials

Heliozone

CHEMICAL COMPOSITION. A specially selected group of waxy materials.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. For all rubber products subject to sunlight exposure. Garden hose, raincoat material, etc.
PHYSICAL STATE. Light green waxy material.
PROPERTIES. Sp. gr., 0.90. Melting point, 67° C. (153° F.). Very stable. Non-toxic. Odorless. No effect on the color of white stocks. Disperses readily.
RELEVANT MATERIALS. Recommended amount 0.5 to 2% on rubber, depending on severity of service.
PURPOSE AND FUNCTION. Improves resistance of rubber to sun checking or cracking. Remains as a plastic film on surface at all temperatures down to 0° F. The film does not dissolve in rubber and disappears at high temperatures. It is not an antioxidant.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Has no effect on cure.
PATENTS. Not disclosed.

Sunproof

CHEMICAL COMPOSITION. Blend of organic materials and waxes.
SELLER. Naugatuck Chemical.
APPLICATIONS. Footwear, clothing, sheetings, tubing, druggists' sundries, flooring, and cable jackets.
PHYSICAL STATE. Pale yellow solid in flakes.
PROPERTIES. Sp. gr., 0.947. Melting range, 65 to 70° C. (149 to 158° F.). Soluble in all rubber solvents. Stable. Non-toxic. Gives no odor to rubber goods. Disperses readily.
PURPOSE AND FUNCTION. Retards sun checking or cracking of rubber exposed to sunlight. Useful in preventing "frosting" of the surface of rubber goods.
METHODS OF USE. Add directly to rubber early in the mixing.
PATENTS. Not disclosed.

Latex Chemicals

Antox, Dispersed

CHEMICAL COMPOSITION. A 50% emulsion of liquid Antox.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Latex compounding.
PHYSICAL STATE. Liquid.
PROPERTIES. For special characteristics see *Antioxidants—Antox.*[1]
PURPOSE AND FUNCTION. Age resister in latex rubber products.
METHODS OF USE. May be added directly to latex with gentle stirring. Recommend 2% of Dispersed Antox on the rubber content of latex.
PATENTS. Not disclosed.

Aresklene

CHEMICAL COMPOSITION. An alkylated and sulphonated aromatic compound 50% by weight in water.
SELLER. The Rubber Service Laboratories Co.
APPLICATIONS. Wetting agent in acid, alkaline, and neutral solutions for facilitating wetting fabrics with latex and rubber processing.
PHYSICAL STATE. Dark red-brown syrupy liquid.
PROPERTIES. Sp. gr., 1.14. pH value between 7 and 8 at 25° C. (77° F.). Soluble in alcohol, acetone, dibutyl tartrate, ethylene glycol, ethyl acetate, and butyl cellusolve. Not soluble in organic solvents immiscible with water. Odorless and substantially neutral in reaction.
PURPOSE AND FUNCTION. To increase the wetting of tire fabrics with latex. Also to increase the extrusion rate of certain types of rubber stocks. Its wetting property gives it value as an auxiliary mold lubricant. It has preservative and insecticide properties.
METHODS OF USE. Dilute with water to wet fabric or as mold spray.
VULCANIZATION. Has no effect.
PATENTS. Not disclosed.

Aquarex D

CHEMICAL COMPOSITION. The one-half sodium sulphate ester of a mixture of higher fatty alcohols consisting chiefly of the lauryl and myristol derivatives.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Stabilizing and wetting agent for latex processes, also a mold lubricant.
PHYSICAL STATE. Liquid.
PROPERTIES. Lubricant.
PURPOSE AND FUNCTION. It stabilizes latex against coagulation by mechanical friction or agitation; facilitates the penetration by latex into fabric, paper, or other porous materials and aids the preparation of pastes or slurries of pigments which are added to latex.
METHODS OF USE. As a mold lubricant spray or swab the hot mold with a water solution containing 0.25 to 0.75% of Aquarex D. The percentage required depends on the nature of the stock and the intricacy of the mold. For stabilizing latex recommend 0.25 to 0.5% on weight of latex; for wetting-out purposes, 0.5% on weight of latex; for pigment dispersion, 0.1 to 0.5% on weight of pigment. A water solution containing 0.5% Aquarex D is recommended for treating textiles or paper which are to be subsequently saturated with latex.
PATENTS. U. S. Nos. 1,968,793-797 inclusive.

Aquarex F

CHEMICAL COMPOSITION. The sodium salt of isoproyl naphthalene sulphonic acid.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Stabilizing and wetting agent for latex processes.
PHYSICAL STATE. White powder.
PROPERTIES. See *Purpose and Function.*
PURPOSE AND FUNCTION. Stabilizes latex against coagulation due to mechanical friction and agitation; facilitates impregnation by latex of textiles, paper, and other porous materials; wets pigments with minimum amount of water in preparation of pastes and slurries which are to be added to latex.
METHODS OF USE. For stabilizing latex recommend 0.2 to 0.5% on weight of latex; for wetting purposes use 0.3% on weight of latex; and for pigment dispersion, 0.5% on weight of pigment. Aquarex F is more powerful as a wetting agent than Aquarex D, but is no more effective for latex stabilization. It tends to cause less foaming of latex than Aquarex D and is sometimes preferred for this reason for pigment dispersion and latex stabilization.
PATENTS. U. S. No. 1,838,826.

Heliozone, Dispersed

CHEMICAL COMPOSITION. A 50% emulsion of Heliozone.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Latex compounding.
PHYSICAL STATE. Liquid.
PROPERTIES. For special characteristics see *Heliozone.*
PURPOSE AND FUNCTION. Protection of latex rubber articles against deterioration by sunlight exposure.
METHODS OF USE. Recommend 1 to 4% of emulsion on rubber content of latex.
VULCANIZATION. Does not affect cure.
PATENTS. Not disclosed.

[1] *Ibid.*, p. 32.

Rubberine-Gel

CHEMICAL COMPOSITION. Vegetable colloid.
SELLER. Jungmann & Co., Inc.
APPLICATIONS. Dry and latex compounding.
PHYSICAL STATE. Brown paste.
PROPERTIES. Stable. Non-toxic. Practically odorless.
PURPOSE AND FUNCTION. Softener, activator of accelerators, emulsifying and dispersing agent, protective colloid for latex.
METHODS OF USE. Added directly in the rubber or latex.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Saponine

CHEMICAL COMPOSITION. Glucoside.
SELLER. Jungmann & Co., Inc.
APPLICATIONS. Latex compounding.
PHYSICAL STATE. Powder, light yellow to brown, according to quality. Available both technical or purified.
PROPERTIES. Stable. Poisonous. Odor pungent.
PURPOSE AND FUNCTION. Emulsifying agent and protective colloid.
METHODS OF USE. Mix directly in latex.
VULCANIZATION. No effect on rate of cure.
PATENTS. Not disclosed.

Sulphur, Colloidal

CHEMICAL COMPOSITION. Forty-five per cent sulphur colloidally dispersed in a water glycerine mixture to which protective colloids have been added.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Latex compounding.
PHYSICAL STATE. A colloidal paste.
PROPERTIES. The average size of the particles is one micron; there are some longer particles and many smaller than 0.5-micron.
PURPOSE AND FUNCTION. Vulcanizing agent for latex compounds. Sulphur particles carry negative electrical charge which is the same as that carried on latex particle.
METHODS OF USE. Colloidal sulphur may be added directly to latex mix without special precaution except that it be stirred in gently and thoroughly. Dilute to same consistency as latex and add slowly to latex.
VULCANIZATION. Chief curing ingredient.
PATENTS. Not disclosed.

Zinc Oxide, Colloidal

CHEMICAL COMPOSITION. Fifty per cent zinc oxide treated so that it will remain in suspension very well in high dilutions.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Latex compounding.
PHYSICAL STATE. A colloidal paste.
PROPERTIES. In an extremely fine and uniform state of subdivision.
PURPOSE AND FUNCTION. White pigment and activator of accelerators in latex compounding.
METHODS OF USE. Add directly to latex mix without special precaution except that it be stirred in gently and thoroughly. Dilute to same consistency as latex and add slowly to latex. Recommend 1 to 2% zinc oxide, on dry basis, on the rubber content of latex for average latex mix. Large amounts are seldom needed for accelerator activation.
VULCANIZATION. Activates accelerators of cure.
PATENTS. Not disclosed.

Pigment Dispersing Agents

Darvan

CHEMICAL COMPOSITION. A synthetic organic chemical containing only dry active material, in powder form.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. For dispersing powders in water and retarding their settling when used in latex or water dispersions of rubber.
PHYSICAL STATE. Granular powder.
PROPERTIES. Neutral or slightly alkaline. Stable, not affected by light or moderate heat, and keeps indefinitely. Non-toxic. Has no discoloring effect on the finished article. Does not cause coagulation, but has a moderate stabilizing action on latex. Does not ferment, putrefy, or mold. Does not cause frothing.
PURPOSE AND FUNCTION. Disperses practically every powder in water. Allows more powder or less water for a given consistency.
METHODS OF USE. Makes a paste of most compounding materials by mixing any of them in water with 4 or 5 parts Darvan (powder form) by weight on the dry powder.
VULCANIZATION. Has no effect on rate of cure or aging.
PATENTS. Not disclosed.

Sperzo

CHEMICAL COMPOSITION. A mixture containing 35% lauryl alcohol, 20 to 25% myristol alcohol, and 40 to 45% cetyl and stearyl alcohols.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. Tire treads and other stocks containing large quantities of carbon black.
PHYSICAL STATE. A colorless liquid.
PROPERTIES. Sp. gr., 0.83. Very stable. Non-toxic. Imparts characteristic odor to rubber. No effect on aging. Disperses readily.
RELEVANT MATERIALS. Recommended to use 0.5% on rubber.
PURPOSE AND FUNCTION. Assists in the dispersion of pigments and in the processing of rubber stocks. Definitely aids in the tubing and calendering of stocks through superior lubrication. The improved dispersion of carbon black due to use of Sperzo results in better wear and abrasion resistance of tire tread stocks.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. No effect on rate of cure.
PATENTS. Applied for.

Retarders

Antiscorch T

CHEMICAL COMPOSITION. Cadmium oleate dispersed on clay.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. To prevent scorching of Thionex stocks during mixing, calendering, and bin storage.
PHYSICAL STATE. Powder.
PROPERTIES. Sp. gr., 2.60. Very stable. Non-toxic. Does not discolor white stocks. Imparts no odor to rubber. Has no effect on aging. Disperses readily.
RELEVANT MATERIALS. For compounds curing at 287 to 300° F. recommend using equal amounts of Antiscorch T and Thionex. For cures above 300° F. twice as much Antiscorch T as Thionex may be used if desired.
PURPOSE AND FUNCTION. For use specifically with Thionex as a cure retarder to prevent scorching at processing temperatures.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. When used in recommended amounts, does not affect rate of cure at curing temperatures.
PATENTS. U. S. No. 1,822,561.

Retarder B

CHEMICAL COMPOSITION. Mono-butyl phthalate.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. To prevent scorching and bin curing of 808 and 833 accelerator stocks.
PHYSICAL STATE. Crystalline.
PROPERTIES. Sp. gr., 1.26. Very stable. Non-toxic. No effect on the color, odor, or aging of rubber. Disperses readily.
RELEVANT MATERIALS. Recommend using 0.2-part Retarder B for each one part of Accelerator 808, and 0.4-part for each one part of Accelerator 833.
PURPOSE AND FUNCTION. For use specifically with Accelerators 808 and 833 to retard curing at processing temperatures. Effective up to 227° F.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. It does not affect adversely the rate of cure at 274° F. and above.
PATENTS. Not disclosed.

Retarder W

CHEMICAL COMPOSITION. Salicylic acid with a dispersing agent.
SELLER. E. I. du Pont de Nemours & Co., Inc.
APPLICATIONS. To render Acrin stocks exceedingly safe handling and to prevent bin curing.
PHYSICAL STATE. Crystalline.
PROPERTIES. Sp. gr., 1.40. Very stable. Non-toxic. No effect on color, odor, or aging of rubber. Disperses readily.
RELEVANT MATERIALS. For most purposes use half as much Retarder W as there is Acrin present in the stock.
PURPOSE AND FUNCTION. For use specifically with Acrin to retard curing at mixing and processing temperatures. Effective up to 227° F.
METHODS OF USE. Add directly to the rubber.

VULCANIZATION. Does not affect adversely the rate of cure at normal curing temperatures. In fact, the use of Retarder W actually enhances the cure of Acrin stocks, giving better physical properties than can be obtained without it.
PATENTS. Applied for.

Retardex

CHEMICAL COMPOSITION. Active ingredient is benzoic acid modified to give maximum retardation at milling temperatures.
SELLER. The C. P. Hall Co.
APPLICATIONS. Anti-scorch material for mixing and processing rubber.
PHYSICAL STATE. White oily powder.
PROPERTIES. Sp. gr., 1.14. Stable. Non-toxic. No staining effect. Disperses readily.
PURPOSE AND FUNCTION. Retards scorching at mixing and calendering temperatures. Activates slightly at curing temperatures. Does not decrease tensile strength, modulus, or permanent set. Has no anti-aging characteristics.
METHODS OF USE. Add to rubber directly; mix and handle as usual.
VULCANIZATION. Functions to raise the critical temperature of many accelerators.
PATENTS. Not disclosed.

U-T-B

CHEMICAL COMPOSITION. Not disclosed.
SELLER. Naugatuck Chemical.
APPLICATIONS. For protection of all stocks liable to scorching (prevulcanization).
PHYSICAL STATE. White powder.
PROPERTIES. Sp. gr., 1.58. Melting range, 180 to 190° C. (356 to 374° F.). Stable. Non-toxic. Does not discolor or give odor to cured rubber. Dispersion preferably by master batching.
RELEVANT MATERIALS. None.
PURPOSE AND FUNCTION. Retards activity of practically all accelerators at processing temperatures.
METHODS OF USE. Master batching recommended for addition of small amounts to rubber.
VULCANIZATION. Does not affect rate of cure at vulcanizing temperatures.
PATENTS. Not disclosed.

Secondary Curing Agents

Telloy

CHEMICAL COMPOSITION. A form of elementary tellurium.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Tire treads and carcass stocks, belt frictions and skims, oil resistant stocks, insulated wire compounds, motor mounts, non-tarnishing articles, and for attachment of rubber to brass.
PHYSICAL STATE. Steel gray powder.
PROPERTIES. Sp. gr., 6.26. M. p., 450° C. (842° F.). Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Captax, Altax, and Tuads.
PURPOSE AND FUNCTION. Secondary vulcanizing agent for super-aging compounds containing low sulphur or no sulphur. Valuable in latex compounds; improves tensile and aging.
METHODS OF USE. Add directly to the rubber. Master batching not necessary.
VULCANIZATION. Telloy is supplementary to sulphur and Tuads in super-aging, low-sulphur compounds.
PATENTS. Not disclosed.

Vandex

CHEMICAL COMPOSITION. A form of elementary selenium.
SELLER. R. T. Vanderbilt Co.
APPLICATIONS. Tire treads and carcass stocks, belt frictions and skims, oil resistant stocks, insulated wire compounds, motor mounts, non-tarnishing articles, and for attachment of rubber to brass.
PHYSICAL STATE. Steel gray powder.
PROPERTIES. Sp. gr., 4.80. M. p., 217° C. (423° F.). Stable. Non-toxic. Disperses readily.
RELEVANT MATERIALS. Captax, Altax, and Tuads.
PURPOSE AND FUNCTION. Secondary vulcanizing agent for super-aging compounds containing low sulphur or no sulphur.
METHODS OF USE. Add directly to rubber. Master batching unnecessary.
VULCANIZATION. Vandex is supplementary to sulphur and Tuads in super-aging, low-sulphur compounds.
PATENTS. Not disclosed.

Stabilizers of Cure

Laurex

CHEMICAL COMPOSITION. Technical zinc laurate by the reaction of technical lauric acid and zinc oxide. Contains about 20% by weight of soluble zinc ideal for activation of accelerators.
SELLER. Naugatuck Chemical.
APPLICATIONS. Used where the best activation of accelerators and plasticizing of rubber are required.
PHYSICAL STATE. Gray powder.
PROPERTIES. Sp. gr., 1.10. Melting range, 90 to 110° C. (194 to 230° F.). Soluble in rubber and rubber solvents. Very stable. Non-toxic. Slight aromatic odor. Disperses readily.
PURPOSE AND FUNCTION. Plasticizes crude rubber. Improves dispersibility of carbon black and other pigments and cure of off-grade rubber. Activates those accelerators requiring a fatty acid.
METHODS OF USE. Add directly to rubber. No special handling required.
VULCANIZATION. Stabilizes cure of low-grade rubbers.
PATENTS. Not disclosed.

Stearex Beads

CHEMICAL COMPOSITION. Derived from fish oil by hydrogenation.
SELLER. Binney & Smith Co.
APPLICATIONS. General rubber compounding for improvement of processing conditions.
PHYSICAL STATE. White solid in fine bead form.
PROPERTIES. Sp. gr., 0.847. M. p., 69° C. (156° F.). Soluble in alcohol, ether, chloroform, carbon bisulphide, and carbon tetrachloride. Stable. Non-toxic. Odorless. Disperses readily in rubber.
PURPOSE AND FUNCTION. Standardizer of crude rubber to definite curing rate. Activator of accelerators. Dispersion agent and softener.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Activates accelerators. Stabilizes cure.
PATENTS. If any, not disclosed.

Stearic Acid (Pressed)

CHEMICAL COMPOSITION. Stearic acid separated from beef tallow by saponification or distillation and pressure.
SELLERS. Binney & Smith Co.; Wishnick-Tumpeer, Inc.
APPLICATIONS. General rubber compounding for improvement of curing conditions.
PHYSICAL STATE. Wax-like white solid, in form of blocks or flakes.
PROPERTIES. Sp. gr., 0.847. M. p., 69° C. (156° F.). Soluble in alcohol, ether, chloroform, carbon bisulphide, and carbon tetrachloride. Stable. Non-toxic. Odorless. Disperses readily in rubber.
PURPOSE AND FUNCTION. Stabilizer of crude rubber to definite curing rate. Activator of accelerators. Dispersion agent and softener.
METHODS OF USE. Add directly to the rubber.
VULCANIZATION. Activates accelerators. Stabilizes cure.
PATENTS. If any, not disclosed.

(To be continued)

The Safety Man's Job

THE March issue of the *National Safety News* contains some mighty stimulating material. E. W. Beck's article, "The Organization behind the Safety Program," is a resumé of his wide experience in carrying on a safety program in the many plants of the United States Rubber Co. The last paragraph of the discussion has particular appeal in its clear analysis of the safety man's job. The viewpoint expressed seems well worth repeating here:

"The task of promoting and maintaining interest in safety is not a one-man job. The success of the work can best be measured by the number of people who are cooperating, and if the safety director is wise, he will stay in the background as much as possible and stimulate the interest of those on the firing line. He should by all means give credit for results achieved to his helpers, as the good work will be reflected through the efforts and results of his associates. He should have no thought of ever finishing his job, for it is one of eternal vigilance."

Properties of Tires

Affecting Riding, Steering, and Handling[1]

R. D. Evans[2]

IN THE preceding installment[3] of this article the discussion of the relation of tires to steering control has concerned itself only with forces which directly affect the path of advance of the vehicle. It may now be in order to consider briefly the reaction within the vehicle itself. It is of interest to examine the force or effort required to change the angular relationship between tire and road or path of advance. This effort may be considered under two headings, as follows:

(1) PRECESSION TORQUE. In the analysis of the forces between tire and road they were resolved into components corresponding to the three primary directions. Our method of measurement determines the magnitude of the net or resultant lateral force with which the tire, in cornering, pushes against the road or against its rim, but we are, of course, not able to determine just what force each element of the tread is developing at each instant of its excursion through the zone of contact. We may, however, measure the total twisting effort, as well as the net lateral thrust, of this system of elementary forces. This twisting effect has been called "precession torque." It may also be appropriately called "self-alining torque."

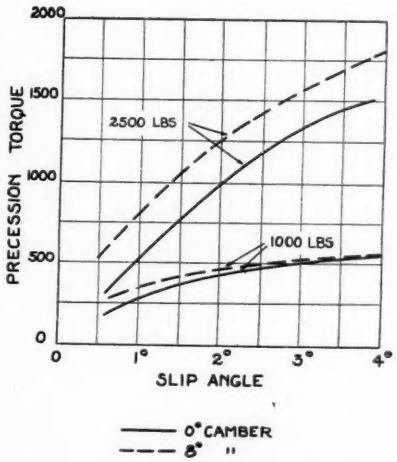


Fig. 1. Values of Precession Torque as Affected by Slip Angle, Radial Load, and Camber

In Figures 1 and 2 are shown values of precession torque as affected by slip angle, radial load, and camber. The relationships are more complicated than in the case of cornering force, and we have not attempted to work out any sort of "coefficient of precession torque."

This torque represents the real, intrinsic effort of the advancing tire to aline itself parallel to the path in which it is compelled to travel. It is the measure of the tire's preference for plain, simple rolling instead of rolling combined with "squirming." Precession torque is, of course, felt at the steering wheel when one pulls or holds the car into a fast turn. It is a torque of considerable magnitude, as the scale of Figures 1 and 2, which is in pound-inches, indicates. This torque, with modern tires at their recommended operating pressures, is sufficient to provide righting action to the steering system even with a large amount of negative caster, especially on hard roads.

Obviously this property of the tire is sensed by the driver only in terms of steering wheel effort, which also depends very largely on king-pin slant, offset, caster, effective gear ratio, and the various frictions involved in the steering system.

As to relative magnitude, perhaps the most important point about precession torque is the fact that it increases rapidly as the radial load on the tire is increased. This fact is of interest in connection with the steering geometry of cars which carry an increased percentage of the total weight on the steering end.

It is also to be noted that camber increases precession torque. This fact is undoubtedly related to the well-recognized stability inherent in cars with independent front springing. When such a car enters a turn, the

[1] Presented at the annual meeting of the Society of Automotive Engineers, Detroit, Jan. 16, 1935. Reprinted from *S. A. E. Journal*, Feb., 1935, pp. 41-49.
[2] The Goodyear Tire & Rubber Co., Akron, O.
[3] INDIA RUBBER WORLD, Mar. 1, 1935, pp. 35-38.

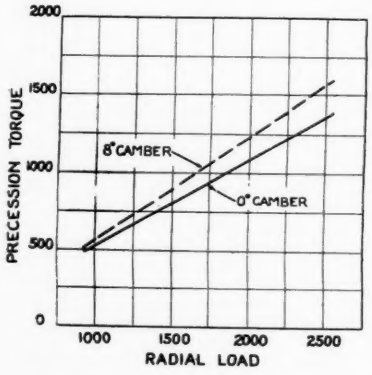


Fig. 2. Values of Precession Torque as Affected by Radial Load and Camber

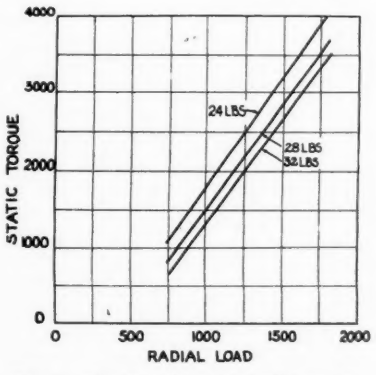


Fig. 3. Showing How Static Torque Depends on the Radial Load and on the Inflation Pressure

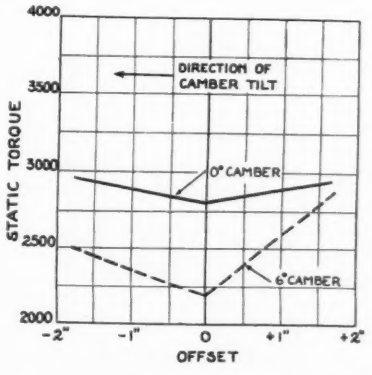


Fig. 4. Showing the Effect of Offset and the Effect of Camber

front wheels lean outward, and the self-righting effect is thereby increased. This is a desirable condition if not permitted to become excessive.

(2) STATIC TORQUE. In the same general category as precession torque is another tire property which we may call static or non-rolling torque. It is the maximum twisting effort necessary to twist the tire, standing under load on a level surface, around a vertical axis. This action involves sliding friction and, therefore, depends on the texture and condition of the road surface. Figure 3 shows how this torque depends on the radial load and on the inflation pressure.

If the vertical axis of torque passes through the true center of the contact area, the tire does not rotate on its own axis when its plane is twisted. If the axis of torque is offset, however, then the twisting action is accompanied by a small amount of rotation of the tire. The effect of offset, as well as of camber, is shown in Figure 4. Positive and negative, as used in Figure 4, refer to the direction of offset relative to the camber tilt of the top of the tire. This property of the tire is of interest in parking or maneuvering the car at very slow speed. The values given in the diagrams show the intrinsic property of the tire alone and do not indicate how this effort needed to twist it is modified by particular layouts or arrangements of front end or by efficiency and ratio of steering gear.

Mechanism of Cornering Power

With this wealth of experimental fact at hand we may venture to speculate about the mechanism of cornering power. First, consider a tire rolling along a level roadway under constant radial load and coerced into traveling with a constant slip angle. Referring to Figure 5, the contact area of tire against road is represented. In this area the line AC is parallel to the plane of rotation of the tire. The line AX is parallel to the path of advance of the tire. The angle between these two lines is, of course, the slip angle.

Let us consider the history of an element of tread as it enters, passes through, and makes its exit from the contact area. Entering at A, the tread element is immediately grasped by two divergent forces. One is the friction of the road which tends to freeze this element to the same spot until it is released at the moment of exit from the contact area. The effect of this force would be to make the tread element follow the path AX. The second force is the lateral rigidity of the tire which tries to make the tread element follow its natural path AC. As long as the friction force prevails, the tire is distorted by an amount represented by CX and feels a thrust from the road in that direction. This thrust, totalized for all the tread elements occupying the contact area at any instant, constitutes the cornering force of the tire. From this analysis we may draw four conclusions:

(1) The upper limit of cornering force is determined by the available friction which, in turn, depends on the coefficient of friction, the unit pressure, and the radial load.

(2) The magnitude of the cornering force depends on the lateral rigidity of the tire structure under the conditions of radial deflection which obtain.

(3) The cornering force depends on the amount of distortion of the tire. This distortion is represented by CX, which is approximately proportional to the slip angle and to the *effective length of the contact area.* It is obvious that the totalized cornering force is roughly proportional to the square of this length.

(4) This analysis indicates that cornering power should depend very little, if any, on speed. Figure 5 of the previous installment[3] is confirmation of this point.

Item (1) is easy to accept if we will just recall our steering experiences on wet, slippery roads. As to item (2), experimental determinations of lateral rigidity of a wide variety of tires, under various conditions of load, inflation, rim width, and the like, show a close parallelism with cornering-power data.

In item (3) the term *length of contact area* merits close attention. Herein lies the important difference between a pneumatic tire and a hard rigid wheel. If a tire is to have cornering power, it must be capable of considerable radial deflection in order that there may be an adequate length of contact area against the road. This means that our tire must be radially flexible. At the same time the tire structure must be as rigid as possible against lateral distortion. It is these two contradictory requirements, which must be met in the same continuous structure, that make the tire designer's problem so extraordinarily difficult.

By contrast, a hard-rimmed wheel—as in the imaginary case discussed previously—is very rigid and practically inflexible in a radial direction. Hence when it presses against a hard road, the area of contact will have negligible dimension in the fore-and-aft direction. Thus, even though the hard rim is very rigid laterally, and no matter how large the slip angle may be, it is impossible for a hard-rimmed wheel to develop a large cornering power or cornering coefficient.

Cushioning Power

So far in this discussion we have confined our attention to the group of lateral forces. Space forbids an equally extended analysis of the other two groups. There is point, however, in giving brief consideration to one aspect of the vertical force, or radial load on the tire. The radial load carried by a tire is always a matter of paramount interest because of its direct relation to durability. We are also concerned with the perturbations of radial load because cushioning ability relates directly to these perturbations.

The term cushioning ability or power has been heretofore used with no attempt to explain or define it more precisely. Cushioning action of a tire depends on its ability, in rolling over an obstacle or road irregularity, to absorb or envelop it with the least possible delivery of additional force to the rim and wheel. It is the kind of thing which cannot be evaluated completely, but for which an arbitrary index can be set up. We may set up such an index by selecting some obstacle, such as a cleat, and rolling the tire over it very slowly under constant load. The maximum rise of the axle is measured. It may be assumed that the impact or jolt delivered to the car when the tire rolls at speed over a similar obstacle on the road is more or less in proportion to this slow-motion constant-load value of axle-rise. Axle-rise may be measured under all desired conditions of load, inflation, rim, cord angle, and the like and becomes an inverse index of cushioning power. It is important to keep in mind that it is merely a trend-index on an arbitrary scale and not a measure or coefficient.

One diagram, Figure 6, will suffice to show how this index may be used in examining the relative effect of various factors on cornering and on cushioning. Thus, increasing rim width from 5.0 to 6.0 inches increases the cornering power as much as a 5-pound per square inch increase of pressure. The same increase of rim width, however, increases the axle-rise index as much as only a 3-pound per square inch increase of pressure. In other words, if rim width is increased to gain cornering power,

the price paid in loss of cushioning is not quite so great as if inflation pressure is increased.

Tread Wear

Since tread wear continues to be the most important aspect of tire performance, all factors which have a possible bearing on the rate of tread wear merit the closest scrutiny. The year 1934 witnessed faster pick-up, still higher driving speeds, snappier brakes and braking, also a general increase in the weight of vehicles. Weight distribution has been greatly changed, and tire pressures, particularly on front wheels, have been substantially reduced. Means of controlling the front wheels have been developed which make it feasible to handle cars with these low front tire pressures without troublesome results as far as the driver is concerned.

For reasons of safety, road builders are making road surfaces more non-skid and hence very much more abrasive. This is true of renovated roads as well as of all types of new construction.

Finally, over much of the country we have had a long, hot, dry summer, which has contributed its share toward the unusually rapid tire wear which has been generally experienced.

It is of the greatest importance that we segregate, as far as possible, these various factors and fairly and open-mindedly evaluate their respective places in the tread-wear picture.

During the last year the Goodyear Tire & Rubber Co. conducted a large number of tread-wear tests. These tests have involved numerous makes and sizes of cars, all new 1934 models, and all maintained at the highest possible level of condition, not only as to engine and transmission features, but particularly as to brake equalization and front-end alinement. These tests, set up primarily in connection with tire-development problems, have been so organized that a considerable fund of information of more general interest has become available. In the comparisons to follow all factors other than those being compared have been properly and scientifically eliminated. All comparisons, which are direct and not "second hand," are given in terms of ratings. These refer to the relative mileage of the tires up to the "just-smooth" stage.

(1) Front versus Rear-Tire Wear. The following tabulation shows the relative mileage of front and rear tires as affected by independent springing and also by extra braking. Each comparison is the average of a number of separate tests, involving different cars of the types indicated. The front and rear tire pressures are in accordance with the respective manufacturer's recommendations.

Type of Front Suspension	Periodic Brake Application	Relative Mileage — Rear	Relative Mileage — Front
Conventional	No	100	135
Independent	No	100	117
Independent	Yes	100	96

Of course these ratings depend on tire pressures, weight distribution, and distribution of braking, but they also depend to an important extent on the particular geometry and structural flexibility of the front suspension and of the steering system. They also depend on the type of road, both as to surface characteristics and the prevalence of curves and grades.

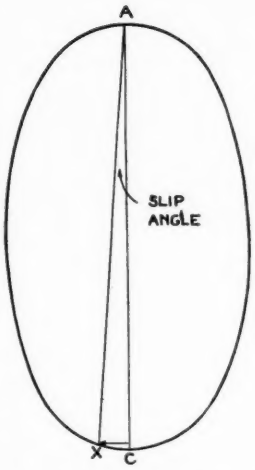


Fig. 5. Illustration of a Tire Rolling along a Level Roadway under Constant Radial Load and Coerced into Traveling with a Constant Slip Angle

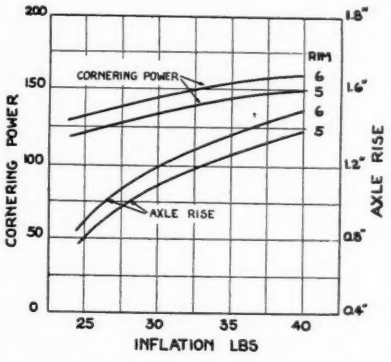


Fig. 6. Showing How the Trend-Index May Be Used in Examining the Relative Effect of Various Factors on Cornering and on Cushioning

(2) Front-Tire Wear. Front-tire wear, as shown in the preceding tabulation, is the average of both left and right tires. There seems to be a consistent difference between the left and right front-wheel position. This difference apparently is related to the type of front springing, as shown in the following tabulation:

Right versus Left Front-Tire Wear

Type of Front Suspension	Relative Mileage — Left Front	Relative Mileage — Right Front
Conventional	100	94
Independent	100	83

These figures represent the average of several individual comparisons in each case. The reason for this difference has not been definitely determined. Whether it is road crown, the tendency for more loose, abrasive material to be on the right side of the road, the habits of drivers in taking left turns faster than right, or some other factor or combination of factors, is not known. We have shown, however, that it is *not* due to a difference of load. With an independently sprung car loaded exactly the same on right and left front wheels—the driver, of course, included—the right front mileage was 86% of the left. Another test with this same car showed that front tires inflated to 22 pounds per square inch give only 70% of the tread mileage of tires carrying 28 pounds per square inch inflation.

(3) Tread Wear of Various Cars. It is a tradition in the tire industry that rate of tread wear varies considerably for different makes and types of cars. As for the cars of 1934, with their numerous departures from chassis designs previously more or less standard, these traditional differences of tire wear seem to be accentuated.

The following tabulation contains a limited amount of testimony in this connection. Again it may be emphasized that these comparisons contain no factors affecting rate of wear, other than the cars themselves and those specified in the column headed "Remarks."

Car	Type of Front End	Tire Position	Extra Braking	Relative Mileage	Remarks
A	Conventional	Front	Yes	100	Load penalizes Car *B* slightly
B	Independent	Front	Yes	75	
C	Independent	Rear	Yes	100	All test conditions identical
D	Independent	Rear	Yes	146	
E	Conventional	Rear	No	100	Car *F* penalized by extra braking
F	Independent	Rear	Yes	115	
G	Conventional	Rear	No	100	Relative load favors Car *H*
H	Independent	Rear	No	67	
I	Conventional	Rear	Yes	100	All test conditions identical
J	Independent	Rear	Yes	100	
I	Conventional	Front	Yes	100	All test conditions identical
J	Independent	Front	Yes	61	

Fleet Operation

As a further contribution to the tread-wear picture, we may cite the results of a recent cross-country trip of part of the Goodyear Test Car Fleet. Nine cars made

this trip together. Five of them had independent suspension, four had conventional axles. All nine were new cars, four-door sedan models, with 1,000 to 1,200 miles of break-in running before starting the trip, and all were in the best possible condition of brake adjustment and front-end alinement.

Each car was equipped with regular production tires of original equipment specification. Pressures were set at the recommended values at the start of each day's trip and checked several times during each day's run. Front and rear pressures were the same. Each car was driven by two drivers, alternating morning and afternoon. Also each car carried the standard three-passenger load.

Throughout the trip the weather was bright and moderately warm. All driving was in the daytime, with a 400-mile daily average for the 2,400-mile trip. The cars traveled close together, at a cruising speed of 60 to 65 m.p.h. The average speed for the trip was 42 m.p.h. The average speed for one of the cars (see following tabulation), used by the fleet commander, was about 6 m.p.h. faster than for the others.

At the end of the trip the tread-wear of each of the 36 tires was carefully measured and analyzed.

The results are given in the following tabulation in the form of ratings. As before, these ratings give the relative mileage to the smooth stage, based on the assumption that the same relative rates of wear would continue.

The column headed *LF/RF* gives the ratio of left front to right front mileage for each car; the next gives the same for the respective rear tires. Then appears the average of the rears compared to the average of the fronts. These columns will repay detailed examination, which will not be attempted here.

Under "Relative Ratings of Cars" the first column, *F*, refers to the front tires. Car *Q* had the slowest wearing front tires; so it was rated 100. The others fall below this in relative mileage rating, down to the case of Car *M*, with a rating of 42. Similarly for the column *R* referring to rear tires. Car *L* showed slowest rear tire wear and was rated 100. Again Car *M* was lowest, with 63.

Finally, the last column gives the average rating, combining the front and rear ratings. Now Car *R* makes the best showing. It is therefore rated 100, with Car *M* at the foot of the class with a 55.

Car	Type of Suspension	*LF* / *RF*	*LR* / *RR*	Aver. *R* / Aver. *F*	Relative Ratings of Cars *F*	*R*	Average
K	Independent	100	100	100	62	86	77
		83	103	140			
L	Independent	100	100	100	45	100	76
		73	96	88			
M	Independent	100	100	100	42	63	55
		64	88	128			
N	Independent	100	100	100	53	74	67
		91	112	135			
O	Independent	100	100	100	73	75	77
		95	114	188			
P	Conventional	100	100	100	80	83	85
		89	121	190			
Q	Conventional	100	100	100	100	80	94
		70	100	242			
R	Conventional	100	100	100	94	97	100
		102	112	189			
*S**	Conventional	100	100	100	70*	78*	77*
		90	88	175			
Average	Independent	100	100	100	55	80	68
		80	103	136			
Average	Conventional	100	100	100	86	85	85
		88	105	194			
Average	All	100	100	100	..	..	..
		84	104	164			
Group Average:		Conventional / Independent	=	100 / 80			

*Car *S* was used by fleet commander. Its average speed was approximately 6 m.p.h. faster than the rest of the fleet.

Conclusions

These results on tread-wear are not submitted as a basis for sweeping or general conclusions or as proof that some particular feature of chassis design is necessarily unfavorable to satisfactory tire service. No claim is made that these ratings would be paralleled in general field experience. The purpose in presenting them is merely to emphasize the wide range of conditions under which satisfactory tire-performance is demanded.

However we cannot ignore these indications that chassis modifications and developments have an important bearing on tire performance, just as a definite balance or compromise of tire properties is necessary for the satisfactory operation of the automobile. Let us fully and clearly recognize our joint responsibility in analyzing and evaluating all factors and aspects of this problem.

It is hoped that this paper may contribute, if only in a slight degree, to a better comprehension of some of these factors.

Para-Graphs

GOLDEN ROD RUBBER. Since the inventor's death rubber experiments have been carried on at the Fort Myers, Florida, estate of Mrs. Thomas A. Edison. Last year the Edison family gave its rubber interests to the United States Government. However, Secretary of Agriculture Wallace asked the Edison concern to carry on the experiments until government chemists could take charge of the work during the latter part of 1935.

POROUS AND MICROPOROUS ARTICLES. Single-piece articles of this description are produced from aqueous rubber dispersions by causing aqueous rubber dispersions to set in molds either with or without the application of heat to give a microporous gel in which the liquid content of the rubber dispersion is contained in the pores. The essential feature which determines such gel formation is the addition of a substance or substances to the latex, which may contain vulcanizing agents and accelerators, fillers, and like additions which are usually made, which bring the pH value of the mix within a certain range. This range is identical with the gap in the pH values of latex, and a mix having a pH value within this range sets as a whole without synæresis or agglomeration to give a plastic non-elastic coherent gel.

LATEX IMPREGNATION OF TEXTILE ARTICLES. Impregnation of thin textile products with latex under relatively low pressures has been practised for some time. A process has now been perfected whereby hydraulic pressures from 750 to 11,000 pounds can be used to force curing latex into thick as well as thin textile articles, not only around all of the individual threads, but into them as well. The most important phase of the

(*Continued on page* 47)

Retreading Patents

Joseph Rossman, Ph.D.

A LARGE number of United States patents have been issued in the past few years for a great variety of apparatus and methods for retreading tires. This article contains abstracts of patents for third circle retreading, full circle retreading vulcanizers, recapping vulcanizers, and special retread molds.[1]

1. Shaler, 845,272, Feb. 26, 1907. A vulcanizer has a hollow casing with a flat base and its upper surface concaved, perforated lugs extending laterally from the casing, clamping devices engaging the perforations in the lugs, a flexible medium connecting the clamping devices, conducting material disposed within the casing, and a heating coil embedded in the conducting material and operatively connected with a source of electrical energy.

2. Frost, 926,695, June 29, 1909. A vulcanizing pad used in repairing tires comprises a flexible heat conserving strip, a plurality of metal tubes secured thereto, electrical resistance wires passing through the tubes, and insulators carried by the wires within the tubes.

3. Shaler, 955,479, Apr. 19, 1910. The vulcanizer has a casing, an electric heating device within the casing adapted to conduct a continuously flowing current, and means thermostatically controlled to regulate automatically the resistance for the current in the heating device.

4. Shaler, 977,972, Dec. 6, 1910. A tubular arched casing is provided with heating means, means for supporting the casing in a position with its intermediate portion curving upwardly from its ends in a position to receive a tire and hold it in a suspended position, and means for binding the sides and top of the tire to the casing. The interior of the casing has electrical heating coils and a thermostatic device controlling the flow of current through a portion of the coils.

5. Stanley, 982,045, Jan. 17, 1911. A tire vulcanizer comprises a casing composed of semi-circular sections pivoted together, a plurality of self-contained heating units mounted at intervals around the casing, and electric connections whereby any number of the units may be heated as desired.

6. Destribats, 1,007,434, Oct. 31, 1911. An apparatus for forming figured treads on tires consists of a vulcanized rubber pattern strip bent to form a ring and means for holding it in position against the tread to be vulcanized. Any desired pattern may be formed upon the inner face of the pattern ring and transferred therefrom to the tire tread.

7. Schwentker, 1,011,860, Dec. 12, 1911. An electric tire vulcanizer comprises a metallic body portion of relatively hard metal, an electric heating unit secured thereto, a mass of softer metal molded to the body, and a tire shaped molding form to mold the metal to the body.

8. Hill, 1,057,736, Apr. 1, 1913. Apparatus for the simultaneous vulcanization of two or more tires or tubes has a central channel mold for a cover intermediately to two comparatively flat surfaces for inner tubes. The casing by which the molds are heated by gas jets is partitioned off into separate sections; each section is adapted for individual heating and provided for the more correct application of the requisite temperature to each particular vulcanizing surface.

9. Batcheller, 1,113,925, Oct. 13, 1914. Tire repair apparatus comprises a pair of side plates with opposed surfaces adapted to conform to the sides of a tire to be treated and movable toward and from each other, radially spaced rings cooperating directly with the inner and outer rims of both plates to maintain them in perfect radial alinement, the rings having opposed cylindrical surfaces and circular grooves forming edge flanges, locking devices including split rings seated in the grooves and serving in connection with the flanges to prevent lateral displacement of the plates, and means to introduce a pressure fluid into the space between the plates and through one of the alining rings.

10. Shaler, 1,158,315, Oct. 26, 1915. A tubular casing features supporting standards, means for supplying heat to the interior of the casing, a stationary bar supported underneath the casing with the space between it and the casing open and unobstructed, a flexible band adapted to be wound about the casing and bar and to bind a tire upon the casing, and compression members for pressing the band inwardly along lines below a tire on the casing and between casing and bar.

11. Stroud, 1,181,692, May 2, 1916. A vulcanizer comprises an outer and an inner casing, each composed of approximately semi-circular segments, each segment being hollow and curved transversely to fit a tire, the sections of the inner casing fitting within those of the outer one, a heater arranged below each section of the outer casing and connected thereto, a hood between the heater and the outer casing for directing the heat of the tire against the latter, the sections being adapted to contain water, and means for raising and lowering the inner casing and for clamping it against the outer one.

12. Burke, 1,216,654, Feb. 20, 1917. A method of vulcanizing tire treads to casings consists in forming an electric heating element on and in contact with both faces of a relatively thin layer of fresh rubber, placing layer and elements between the casing and the tire tread, wrapping the whole to maintain casing and tread in close contact with the rubber and the element, and then passing a heating current through the latter.

13. Heintz and Ruf, 1,262,598, Apr. 9, 1918; Reissue 14,913, July 13, 1920. A vulcanizer comprises a hollow fluid-tight casing having a vent opening, a working surface, an electric heating element applied to the side of the casing opposite the working surface, means for clamping an object in operative relation to the working surface, and means associated with the vent opening for relieving excessive internal pressure in the casing.

14. Lauer, 1,271,589, July 9, 1918. A tire retreading vulcanizer comprises a support for the tire to be vulcanized, means for securing the tire to the support, an electric heating element arranged above and supported

[1] For a general description of current practices in retreading see D. C. McRoberts, "Retreading," INDIA RUBBER WORLD, Sept. 1, 1934, pp. 39-42; "Retreading Shop Equipment," *Ibid.*, Oct. 1, 1934, pp. 35-37, 41; "Retreading Inspection," *Ibid.*, Nov. 1, 1934, pp. 37-38; "Retreading—Preparation of the Tire," *Ibid.*, Dec. 1, 1934, pp. 33-34; "Retreading—Cementing and Building," *Ibid.*, Jan. 1, 1935, pp. 39-40.

by the support and adapted for insertion between tire and tread member to be vulcanized together, and means for pressing the center and edge portions of the tread member into close engagement with the tire.

15. Harris, 1,301,431, Apr. 22, 1919. A retread vulcanizer comprises an annular mold, compression screws mounted radially therein, shoes for insertion into the tire casing against a filler, means for operating the screws, and a puller mounted upon one screw and adapted to grip the casing and pull it loose from the mold.

16. Stephan, 1,307,798, June 24, 1919. A retread mold has a pair of hinged tire encircling members, means to supply heat to them, a pressure ring arranged within the members, a sectional ring interposed between the pressure ring and the tire encircling members, and radial set screws extending through the pressure ring and engaging the respective sections of the sectional ring to effect adjustment of the latter.

17. Booth, 1,317,124, Sept. 23, 1919. An electric vulcanizer for tires comprises a tire form for supporting and holding to shape a tire to be vulcanized, a plurality of telescoping filler sections adapted to be placed on the form for filling it out to any conventional tire size, a heating pad interposed between the form and the tire, a bead vulcanizer applied along the bead of the tire, and means to press the heating pad and bead vulcanizer tightly against the tire.

18. Brooks, 1,327,307, Jan. 6, 1920. Tire retreading apparatus consists of a mold and a matrix extending throughout its length. The matrix, being in sections, one of which is stationary and another, at one end of the mold, movable in the direction of the length of the mold, contains an anti-skid tread design, which on the movable section is disposed differently with respect to one end of the latter than with respect to the other to permit a variation to be produced by reversing the movable member.

19. Dorsey, 1,335,783, Apr. 6, 1920. A vulcanizer comprises a circular casing consisting of an upper and a lower semi-circular member, the ends of which communicate through hollow dowels carried by one section and passing into the other, valves for cutting off this communication, removable circumferential tread and bead molds receivable within the casing, and means for connecting the two members.

20. Gwynn, 1,336,220, Apr. 6, 1920. A tire vulcanizing device consists of a heat conducting vulcanizer body having on its upper side a concave U-shaped pocket, which is open at its ends to enable it to receive the tire to be vulcanized; the vulcanizer body has a chamber therein to hold a fluid-heating medium; the chamber extends upwardly on the sides of the U-shaped pocket; a non-conducting casing for the vulcanizer body covers the sides thereof, and non-conducting parts are disposed at the ends of the pocket to support the tire.

21. Maier, 1,336,911, Apr. 13. 1920. The process of retreading tires with configurations consists in first vulcanizing a section of the periphery of the tire in an arcuate vulcanizing bed containing configurations, then moving the tire so that another section of its periphery is brought into engagement with the vulcanizing bed, and inserting between it and that portion of the tire already vulcanized an insulator having on one face thereof configurations conforming to those on the tire, whereby overvulcanization and disfigurement of the configurations of the vulcanized portion of the tire are prevented.

22. Burke, 1,339,736, May 11, 1920. A vulcanizing element comprises two coalescent layers of unvulcanized rubber and a series of reduplicate electric heating wires interposed between and having their ends projecting beyond the respective edges of the layers, the successive loops of the wire lying parallel to each other and at an acute angle to the median line of the layers.

23. Fontaine, 1,346,947, July 20, 1920. A retreader clamp comprises a pair of arms pivotally connected, means on each arm to engage a flange of a retreader, and a clamping screw carried by one of the arms and adapted to lock them in position when the screw is brought into engagement with an object in the retreader.

24. DeLong, 1,347,213, July 20, 1920. A retreader clamp has a seat with upwardly tapered walls fitting the socket of the clamp, a laterally extending flange on the lower end of the bushing, and means extending through the flange and anchored in the clamp to prevent rotation of the bushing with relation to the clamp.

25. Huey, 1,354,754, Oct. 5, 1920. A pressure clamp comprises a support, a pressure foot movable upon and guided by the support, a cam lever pivoted upon the support and engaging with the pressure foot to move it into clamping position, means whereby the pivotal element may be shifted toward or from the work, and means for holding the lever in clamping position when the pivotal element is in that position most remote from the work.

26. Hurwitz, 1,357,984, Nov. 9, 1920. A vulcanizer comprises opposed members, one of which has a hollow body and the other member carrying a rockable member including a hollow body, and each of the hollow bodies having a chamber and a heat conductive plate forming one wall of the chamber, resistance coils arranged in the chambers and insulated from the bodies, means connected to the coils and extending outside the bodies for the electrical connection of the coils with a source of electrical energy, and means adjustably and detachably connecting the two first-named members together.

27. Legnard, 1,368,268, Feb. 15, 1921. A full circle retreading mold comprises a plurality of sections for abutment end to end, each having a steam chamber with provision for ingress and egress of steam, the steam inlets being proximate to a thin end wall of the chamber, dowels on the thin wall, corresponding recesses in the opposite end wall, and inserts for each abutment having provision of dowels and recesses for holding it in circumferential register with the contiguous mold sections, and means for locking the mold sections together with or without the inserts.

28. Ballou, 1,374,805, Apr. 12, 1921. A mold for rebuilding tires has a plurality of bead forming sections, means for retaining these sections together, a plurality of sidebody forming sections, an expansible tread forming element adapted for interengagement with the sidebody forming sections, and means for retaining the sections in proper tire building relation.

29. Hufford, 1,380,320, May 31, 1921. To produce a tire retreading matrix place a casing having the desired tread surface conformation into a mold; arrange the parts so that the tread surface of the casing is spaced apart from the surface of the mold; next pour molten metal into the space between mold and tread surface of the casing; then apply the retreading matrix so formed to the tire to be retreaded.

30. Vanderpool, 1,380,854, June 7, 1921. A vulcanizing mold has a tire receiving cavity, a non-compressible core for the tire, a pair of posts having an engagement with the walls of the mold at points opposite each other, a cross-bar loosely mounted on the posts, springs between the cross-bar and abutments on the posts, and a screw threaded in the cross-bar arranged to apply pressure upon the core and also tension to the springs.

31. Maier, 1,380,919, June 7, 1921. A matrix for tire retreaders consists of an aluminum body portion

(*Continued on page* 39)

Sewing Machines for Rubber Goods

Typical Rubber-Textile Constructions—Special Purpose Sewing Machines Utilized in Making Rubber Goods

THE association of textiles and rubber in the manufacture of goods began inevitably with the original attempts to employ rubber in the manufacture of waterproof clothing and shoes and elastic fabrics. The utilization of textiles, particularly of cotton, in rubber processing and the construction of rubber goods have been facilitated by the introduction of a number of special purpose sewing machines, notably in the manufacture of weather-proof clothing, footwear for general and sports wear, tires, mechanical rubber goods, novelties, etc. Concerning several of these machines, it may be of interest to note what they do and where they specifically apply in rubber goods construction.

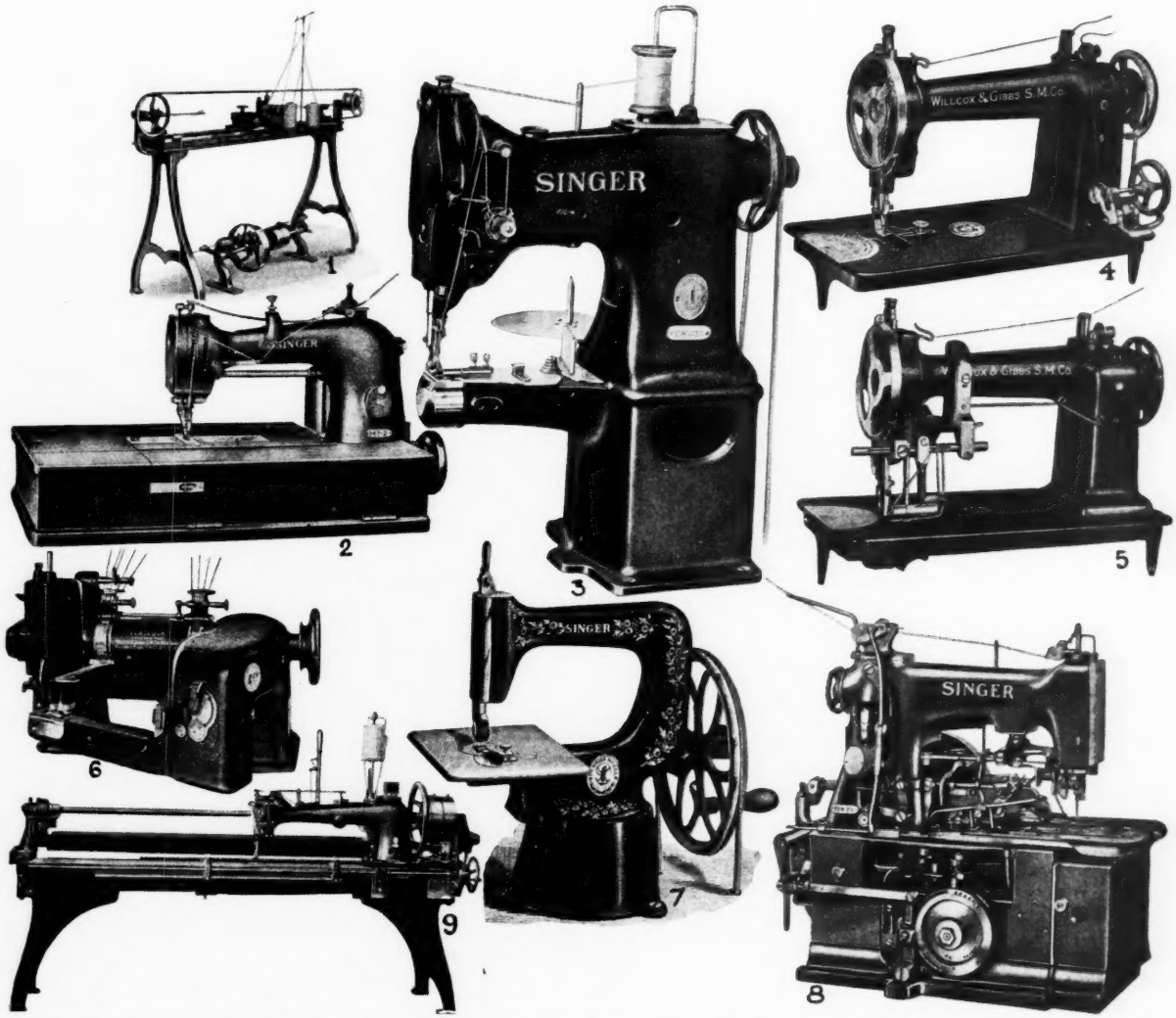


Fig. 1. Curtis & Marble Railway Sewing Machine. Fig. 2. Singer Single Needle Machine. Fig. 3. Binding Machine. Fig 4. Willcox & Gibbs Single Needle Lock Stitcher. Fig. 5. Lock Stitcher and Ruffler. Fig. 6. Willcox & Gibbs Flat Lock Machine. Fig. 7. Folder and Crimper. Fig. 8. Eyelet End Button Hole Machine. Fig. 9. Belting and Duck Packing Machine.

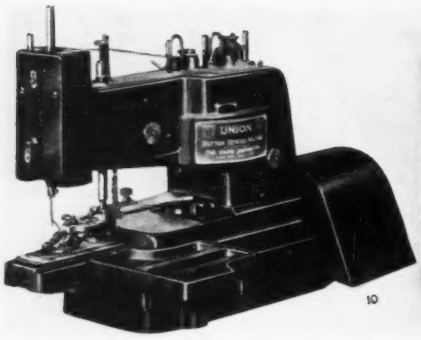


Fig. 10. Button Sewing Machine

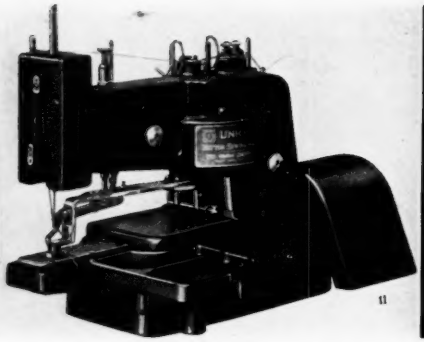


Fig. 11. Leather Shank Button Sewing Machine

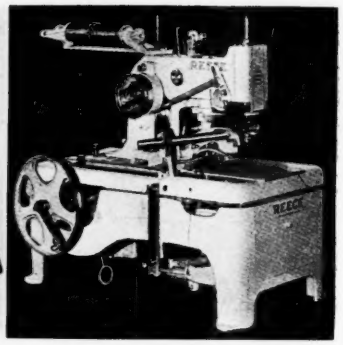


Fig 12. Reece Buttonhole Machine

Liners and Yardage Goods

The ordinary lockstitch domestic sewing machine is not sufficiently heavy and durable for factory service to join up cotton piece goods in long lengths as liners or for spreading. The most suitable machine for this work is one of the so-called railway type. There are many forms, both portable and fixed, operated by hand, belt, or motor drive. The more elaborate of the fixed machines are built for sewing, rolling, and indicating yardage measurement on a dial.

Referring to the group illustration, Figure 1 represents a railway sewing machine for making two parallel rows of stitching forming a lap seam. Seams of this type are often called for on goods which are to be coated with rubber or other compositions.

Tennis Shoes

Stitching is called for in assembling tennis vamps to quarters and for binding the shoe tongues. The first named operation is done on the machine, Figure 2. This is a high speed, single needle, two-thread chain stitch machine that is fitted with independent upper and under feeds. It will maintain a speed as high as 3,000 stitches per minute, depending upon the nature of the material being sewn.

The machine shown in Figure 3 is useful for binding canvas shoe uppers and tongues. Not only are the binding operations perfectly accomplished, but the speed can be brought up to 2,700 stitches per minute.

Clothing and Novelties

Various machines are designed for the efficient and economical sewing of all articles where single-needle lockstitch work is required. One of the most rapid of this sort is pictured in Figure 4. Among the outstanding features of this machine are perfection of design, precision made parts, smoothness of operation, flexibility of service, and accuracy of work at a speed of 4,000 stitches per minute.

Figure 5 represents an improved lockstitch ruffling machine which is used in single-needle stitching of rubber aprons, bathing caps, etc. This machine is fitted with an adjustable ribbon guide which eliminates handling of the ribbon by the operator.

Figure 6 is designated as a flatlock machine and is used for attaching rubber to rayon fabrics of knit construction in the production of sanitary garments.

The machine shown in Figure 7, without stitching mechanism, is especially designed for folding and crimping the raw edges of fabrics at one operation. It can be used for aprons and bathing caps. The crimping operation takes up the fullness around the edges of the fabrics when formed in curves. This effect is accomplished by a crimping pinion located above the work and a corrugated crimping wheel below the work. When the crimping pinion is lowered upon the work, pressure on the pinion is exerted by a spring, and the folded edge of the fabric is crimped as it is fed through the machine.

Special Machines for Clothing

Interesting machines employed in the raincoat trade are buttonhole machines and button sewing machines. Of buttonhole machines two examples are pictured, both of which are used for raincoats as well as for other clothing.

The machine in Figure 8 is especially adapted for making eyelet end buttonholes, 1⅛ or 1¼ inches long, with adjustable taper bar. Strength is given to the buttonholes by a reenforcing cord which is laid under the stitching on the finished side of the work. This cord also helps to retain the shape of the buttonholes. Economy is effected by automatically cutting both threads and cord close to the work at the completion of each buttonhole. As the buttonhole is also automatically cut after stitching, each one is finished in one operation. Much of the operator's time is thus saved, and a large production is obtained at the lowest possible cost.

The buttonhole machine pictured in Figure 12 is an adjustable fly bar machine characterized by wide range for either straight open end or fly bar buttonholes. Lengths of the hole or fly bar can be adjusted in 30 seconds.

Button Sewing on Raincoats

There was a time when sewing buttons on raincoats and other garments of rubberized fabrics presented a very real problem to the manufacturer faced with the task of stepping up production and cutting costs. Now, however, with the development of reliable machines that will sew thousands of buttons a day a few operators can keep pace with the requirements of a large factory.

The model 175-4 illustrated in Figure 10 sews either two- or four-hole top buttons and stay buttons in one operation. It makes sixteen stitches, including the diagonal cross-over stitch. The machine can be fitted to take top buttons from 10 to 60 ligne and stay buttons up to 45 ligne.

For sewing leather shank buttons, ranging from 18 to 45 ligne, model 175-10, Figure 11, is used. The top button and the underneath stay button are sewed in one operation. The button is fastened with sixteen stitches.

The operation of these machines is entirely automatic. The buttons are placed in clamps in which they are held while the machine stitches, knots, and then severs the

thread close to the underside without any guidance by the operator.

The feat of sewing all kinds of leather shank and eyelet buttons has been a remarkable development in the sewing industry. These machines are now being used throughout the clothing and garment industries and effect economies that soon pay for their cost.

Sewing Belting and Duck Packing

Certain types of belting and duck packing slabs are stitched for the purpose of preventing ply separation in the event of failure of the friction to hold the duck plies permanently in place. Stitching of this sort is done by powerful and efficient machines of the type shown in Figure 9. They can be used for stitching almost any kind of material capable of needle puncture in thicknesses up to ¾-inch, depending on the variety of the individual machine and the character of the work. Certain of these machines are built for sewing a single line and others for two parallel lines of lock stitching. They are also provided with various lengths of bed to handle work of different widths.

The machine shown in Figure 9 has a clear working space of 27 inches at the right of the needles and 54 inches at the left of the needles, making it possible to stitch to the center or edge of a belt 54 inches wide. The work is automatically and continuously fed through the machine while the stitches are being formed. This enables the machine to be operated at as high as 500 stitches per minute.

Investigation on the part of rubber goods manufacturers will disclose tools and machines developed in other industries that can be used advantageously in the production of various rubber specialties as new uses for rubber are developed and production perfected. A case in point is that of special purpose sewing machines which are found advantageous in rubber lines as varied as clothing, footwear, mechanicals, novelties, etc.

Retreading Patents

(*Continued from page* 36)

with a concave surface from which a beveled anchoring hole extends and a type metal configuration cast on the concave surface and having a portion extending into the anchoring hole, whereby the configuration is securely fastened to the body portion.

32. Everett, 1,389,821, Sept. 6, 1921. A tire vulcanizer has a tire receiving mold, a bead clamp, with a longitudinal slot, insertible into the mold to hold the tire beads in proper relation, a core of elastic compressible material for reception in the tire, the core having a longitudinal split for registration with the slot, and a wedge insertible into the split through the slot for laterally expanding the core.

33. Duncan and Duncan, 1,391,374, Sept. 20, 1921. A vulcanizing apparatus has a mold with tire bead irons and a bag adapted to be placed into a tire casing in the mold and having means whereby it may be inflated, a pressure gage with a yieldingly held plunger, the body of the pressure gage having screw-threaded engagement with a part held in respect to the mold for movement toward the tire casing to carry the plunger into engagement with the tire bead irons and place the tire casing and bag under a predetermined pressure and movable to indicate fluctuations in the pressure in the bag.

34. Jones, Jr., 1,396,217, Nov. 8, 1921. A tire vulcanizing core has a tubular annulus comprising a greater segment and a lesser segment secured to each other by a pivot parallel with the axis of the annulus and disposed at the inner periphery of the annulus. One of the segments has a packing in its hinged end; the other segment has a curved tubular extension projecting through the packing and slidable therein for maintaining these hinged ends in a fluid-tight condition when the lesser segment is swung inward.

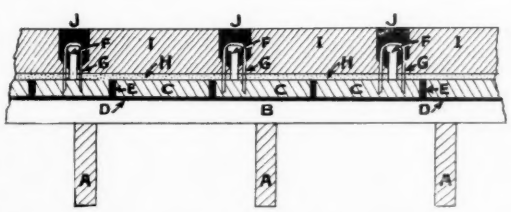
(*To be continued*)

Rubber Paving on Bridge Planking

Rubber Bridge Floors Are Economical, Durable, Easily Repaired, and Proof against Non-Skidding

W. E. Swanson

ORDINARILY planking on bridges requires renewal every 2 years. A plan for installing such planking to prevent it from warping and to insure a proper foundation for rubber pavement is shown in the accompanying illustration, which represents a vertical cross-section of a rubber paved roadway transverse of the bridge beams on a plank foundation. The construction indicated is detailed as follows.



Construction of a Rubber Paved Plank Bridge Floor

Upon the floor beams *A, A, A* double planking is laid. The under planking *B* is spiked at right angles to the beams *A* and is overlaid by the second planking *C, C, C* laid at 45 degrees. The abutting ends of planks *C* are rabbeted on their lower side to form channels *D, D* connected by ports *E, E* to the upper surface of the planks. Through these ports the channels *D* are filled with hot sealing pitch making the plank end joints watertight.

Rectangular welded steel grills *F, F, F* are spiked to place by heavy staples *G, G, G*. The grill is partially filled with a composition *H, H* composed of rubber, asphalt and grit which serves to prevent the rubber blocks *I, I, I* from pulverizing the planking. The joints around the blocks are filled with sealing pitch *J, J, J* to make the paved surface watertight.

Annals of Rubber[1]

Chronological Record of the Important Events in the History of Rubber

1846. J. W. Harmon patented the softening of india rubber by grinding and by the use of either turpentine or naphtha combined with steam.

Tappan Townsend patented the placing of hose between railway cars for various purposes. The idea at that time was in the direction of ventilation.

W. C. Fuller patented the application of rubber cushions to the ends of railway carriages. He formed the buffers of disks of india rubber, with strips of metal inserted between, the metal disks being larger in diameter than those of the rubber. He also formed springs of long india rubber straps extending along between teeth.

The English inventions of note during 1846 follow.

Charles Hancock made certain improvements in the manufacture and applications of gutta percha. After cleansing the gum it was placed in a plastic state in a cylinder screw press, kept hot by a steam jacket, having a bottom perforated with numerous holes. Through these strainers it was squeezed several times, as often as was considered expedient. An alternative was to dissolve the gutta percha as imported, and filter it, while warm, through flannel, felt, or fine wire gage; then the solvent was distilled off. Hancock also combined gutta percha by means of a masticator with jintawan and caoutchouc, or by adding orpiment, or other sulphurets, or sulphur to the compound of the gums. His formula was 50 parts of gutta percha and 24 of jintawan, 20 of gutta percha, and 6 of orpiment. This was heated to a high temperature, which made the product more lasting. Hancock also made sponge by using alum, or carbonate of ammonia, and heating the compound in an oven in molds. He made it hard by confining the mass in molds in a high temperature for several days. He rendered it soft and pliable by exposing it to sulphurous acid gas, and still more pliable by adding wax, or tallow. He made varnishes by heating the compound under pressure to a temperature of 300 or 380° F., or combining the compound with wax, or animal and vegetable fats, and dissolving the combination in turpentine and then evaporating it. In the compound the quantity of gutta percha stated in the formula was diminished as a greater degree of elasticity was required, and vice versa for increased firmness. All of Hancock's improvements in the manufacture of gutta percha at this time created much interest in the United States as well as in England, the Commissioner of Patents in our country devoting much space in his report to a discussion of his methods.

Thomas Hancock patented a mode of manufacturing and treating articles made of caoutchouc or its combinations. He placed the combination in or upon molds, plates, or forms during the process of vulcanization. He forced the caoutchouc into such molds by pressure and heat. He also combined caoutchouc with vegetable pitch, resin, wood, and cork dust, and fibrous substances, subjecting them to vulcanization. In all these compounds he prevented adhesion to the mold by dusting on silicate of magnesia.

Alexander Parkes treated caoutchouc, gutta percha, and their compounds by the use of chloride or hypochloride of sulphur dissolved in bisulphuret or sulphuret of carbon, coal, naphtha, or turpentine. He also introduced a new solvent by passing sulphurous acid gas over granulated camphor until a liquid was produced.

He also submitted caoutchouc and its compounds to such gases as sulphurous acid, chlorine, nitric acid, fluorine, or the vapors of bromine or iodine. The article was suspended in a vapor of a solvent, and the gases, one or more of them, passed into the chamber.

These articles, before being changed, were combined with innumerable fibers, or earths, or oxides, or bronzes, also with resinous gums or the cow-tree gum, or the wood-tree gum from Van Dieman's Land. The articles were ornamented by painting and printing. He also recovered the waste of the gum by boiling it in a solution of muriate of lime, in certain proportions, until the pieces could be readily united, when it was washed in hot alkaline water.

Later in the year Charles Hancock made other improvements in the manufacture of gutta percha. The acidity or smell of the gutta percha was diminished by subjecting it first to an alkaline solution, and then to a solution of chloride of lime. A large number of compounds are mentioned, they chiefly being dissolved in bisulphuret of carbon.

For the first two years (1845-1847) after the introduction of gutta percha as an article of commerce and manufacture, it was confined to England. As soon as it was discovered that gutta percha had any value for manufacturing purposes, all the patents in England were purchased, and a gigantic company formed enlisting in it many members of the East India Co., and at once began manufacturing gutta percha in all its branches.

A curious fact about the early use of gutta percha was that by many it was believed to have a far more brilliant future than india rubber. Gutta percha as insulation for telegraph wires was introduced by Ernst Werner Siemens in 1846.

The New York Belting & Packing Co. began manufacturing mechanical rubber goods at New Town, Conn.

1847. Charles Hancock's patent proposed a new combination of materials for sulphuretting gutta percha. His proportions were 48 parts of gutta percha, 6 parts sulphuret of antimony or hydrosulphuret of lime, and one part of sulphur, all boiled under pressure. Caoutchouc was treated similarly. He also submitted the gums to steam heat and the vapors of orpiment and sulphur, etc. He employed binoxide of nitrogen and chloride of zinc for the purpose of improving the quality of gutta percha or vulcanized caoutchouc. He brushed the gums over with a solution of resin in boiling oil and placed it in a heated chamber from 75 to 100° F. for several hours, when afterward it took a Japan-like polish.

He cut the gutta percha into strips or ribbons or into thread. This work was done by a pair of grooved rollers of steel or iron mounted in a frame. This patent was commented on in our own patent office and doubtless attracted a world-wide attention. (*To be continued*)

[1] Continued from India Rubber World, Mar. 1, 1935, p. 47.

American Foreign Trade in Rubber Products

E. G. Holt [1]

IMPORTS of rubber manufactures declined 30% in value and about 42% in quantity in 1934 compared to 1933. Prices of imported goods increased 20% on the average, comparing with an increase of 22.3% in the average value of gold in terms of American currency. Imports were less than $1,600,000 during 1934; while not large, they are often troublesome to the domestic price structure particularly in lines like erasers, friction tape, druggists' sundries, and certain rubber toys, mainly from Japan.

Exports of rubber manufactures increased 22% in value, 13.2% in quantity, in 1934 over 1933. Prices of goods exported increased 7.7% on the average. While the gross figures for the two years show a considerable increase, the gain was during the first half of the year in comparison with the extremely low exports of early 1933; during the last four months of 1934, despite higher prices, monthly export values were lower than for corresponding months of 1933. The outlook for 1935 is for highly selective foreign demand for American rubber products, such as goods specially adapted for hard conditions of mechanical service, etc., rather than for standard cheap lines.

The year 1934 marked a new high peak for exports of crude rubber from producing countries, over 1,000,000 tons. Rubber consumption was also at a high level. World stocks of rubber increased over 50,000 tons for the year, but from the time restriction was introduced to the end of the year stocks outside the restriction area showed a slight net decline. Hence it appears that the scheme held supply in balance with demand during the period of normally low consumption and normally high production. The fact that the quotas agreed on under the scheme aggregate less than 1,000,000 tons, while restricted exports aggregate over 1,000,000 tons, clearly indicates that the quotas are considerably below the capacity of production and that exports at 100% of quota would represent a considerable measure of restriction.

The International Restriction Scheme

The new intergovernment agreement is, in essence, rather a bargain between the parties based upon depression production, than an arrangement based upon the consideration of equities of the parties. After 1931 the British continued willing to consider restriction proposals, but definitely refused to initiate further negotiations; and after the gold standard was abandoned in England, the companies operating in British possessions seemed better situated than those in Dutch territory. The French Government came to the aid of the Indo-Chinese producers with a subsidy which made them able to carry on indefinitely and gave them a strong trading position. The Dutch native producers, not being driven by necessity to produce, allowed their output to decline sharply during 1932 and early 1933.

As a result of the agreement, the Malayan estates have relatively high quotas on the average, and the British delegations on the International Rubber Regulation Committee have a majority vote control over operation of the scheme, including determination as to its continuance beyond 1938, except in fixing the percentage of restriction, where 75% of the Committee must approve.

The Dutch estates likewise appear to have quotas reasonably close to their capacity, and the Dutch delegation, representing something over 33% of the voting power, must assent to the percentages of restriction decided upon, giving them the balance of power in such decisions.

In return for French cooperation the Indo-Chinese rubber producers appear to be free to operate at approximate capacity, the terms being such as to make any actual restriction of production there very unlikely during the period of the current agreement. France also reserves a strong bargaining position for use in case it is decided to continue the agreement beyond 1938.

The Dutch natives have a relatively low quota under the application of the quota in Netherland India. During the March-June, 1934, period they exported at an annual rate of around 250,000 tons; their 1934 basic quota was about 147,000 tons, and the quota for 1938, 202,000 tons. The export tax system in effect on native rubber exports results in the producer receiving less than half the average market price of his product. It is, therefore, not surprising that the Government is moving as rapidly as possible toward a system of individual restriction in the native districts.

The liberal terms enjoyed by Indo-China may have irritated some other small nations party to the original agreement. The Siamese legislature refused to ratify the agreement on the ground that the quotas assigned Siam were too low. India, since ratification, has asked for upward revision of their quotas. The amount they *can* produce under prices expected to be realized with restriction in effect is a different matter from what they might produce in a free market. This raises the question of whether the more important parties to the agreement will be willing to "hold the umbrella" over the less important parties and grant concessions desired in return for cooperation under the scheme.

Previous attempts at rubber restriction, following in each case a period of low prices resulting from a world trade slump, have stimulated rubber production from new sources. Brazilian valorization led directly to large scale plantation production; the Stevenson Scheme was responsible for development of native plantings in the East and the beginnings of estate production in Liberia and Brazil. The Brazil of 1910 was absolutely unsuited for plantation production because of extremely prosperous times and high living costs there; whereas opposite conditions prevailed in the East. Tropical America in 1935 does not present equally formidable barriers to rubber

[1] Assistant chief, Leather and Rubber Division, United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

plantation developments, and there exist, outside the restriction area, sufficient sources of high yielding budwood to serve as nuclei for scientific estates in the Western Hemisphere.

In final analysis, the international rubber restriction scheme may be considered a kind of test case for industrial controls. With the background of Brazilian valorization in 1909-10, voluntary restriction in 1920-21, the Stevenson Scheme in 1922-28, there is more actual experience in attempted control of this commodity than almost any other. The Stevenson Scheme failed—its faults included greed, inequity, venality, and jealousy between the parties as well as others. Will the new scheme fail because of similar factors, or will it prove itself an agency for human betterment?

In conclusion, we in America have a wonderful back record of accomplishment; we have not run our course, and we must have faith in our future destiny. The door of opportunity still opens more widely here than in any other country. We need to test the questions which present themselves to us on the principle of "what is right and what is wrong," and having done so, we need to be willing to act fearlessly in the manner dictated by conscience.

Internationalism in Tire Manufacture

FIFTEEN years ago the United States, during the post-war boom, was almost the only country with production of peacetime goods geared to supply demand much beyond domestic consumption requirements. Tire manufacture in pre-war days was confined to the United States and Canada, a few European countries, and a small production in Japan and Australia, and during the two years before the 1920-21 slump the European tire manufacturers were only gradually establishing world distribution. They strengthened their position steadily during the slump and until 1924; many of the American companies previously participating in export trade dropped out of foreign markets during this period. It was no longer possible to conduct export tire trade in a haphazard manner; it was necessary to maintain current records of tire prices, tariff changes, and general economic conditions for each market. It was about this time that several American companies joined in a Webb-Pomerene export association in an endeavor to establish better practices and more uniform trading policies in foreign tire markets, a move which incidentally won much cooperation from foreign tire producers once the association had demonstrated an ability to present a united front to foreign competition.

The severe competitive conditions in the trade made tire exporting a gradually less and less attractive proposition to all but the largest companies. As the field narrowed, and as the use of the automobile grew all over the world, more and more markets developed to a point that would support a domestic tire factory, and at the same time the tendency toward nationalism began to assert itself through higher tariff barriers on tire imports. The result was the establishment of more tire factories in foreign countries, sometimes by citizens of the particular country, sometimes as a branch factory by an American or European parent company. One effect of this action has been to reduce the importance of the United States in rubber consumption, from over 70% of the world total in 1922 to a bare 50% ten years later.

The first branch factories established by American tire companies were in Canada, and their establishment was influenced partly by a desire to avoid the tariff barrier on imports and partly for use as a base for shipping to England during the World War. Subsequent branch factories established elsewhere have been influenced by similar motives, i.e., to avoid tariff barriers or gain their protection against competitors and to supply other markets more easily reached from the country where the branch factory is located than from the country where the parent company operates. The American tire companies, by the way, were not pioneers in the branch factory movement. The French Michelin and Bergougnan companies operated factories in New Jersey for many years although both companies have long since withdrawn from the United States, and the Americans appear merely to have taken a leaf from the books of competitors.

An incomplete picture of the company concentration in world tire production and of the international character of the tire industry is afforded by the following list of locations of subsidiary, affiliated, or licensee factories associated with a few of the leading companies engaged in international tire trade. The location of the parent company is first stated in each case.

Dunlop	**Michelin**	**Goodyear**	**Firestone**
England	France	United States	United States
France	Italy	Canada	Canada
Germany	England	England	England
Japan	Germany	Argentina	Argentina
Canada	Spain	Australia	Spain
United States	Czechoslovakia	Java	Switzerland
Australia			
South Africa	**Pirelli**		**Goodrich**
	Italy		United States
Englebert	Spain		Canada
Belgium	England		France
Germany	Argentina		Japan
			England

There are many other companies with one or more branch factories in foreign countries, and others with foreign manufacturing arrangements. Recently there seems to be some tendency toward licensing established foreign factories to produce on a royalty or similar basis. If a manufacturer has enjoyed a good business in a particular country, having popularized his product through advertising and sales promotion work over many years, and is forced as a result of high import duties, a limited quota, or exchange restrictions to consider the alternative of abandoning a market or arranging for production of his tire by some factory in the country, the latter course may naturally seem preferable. Recent rumor has it that Goodyear will make Dunlop tires in Argentina and Dunlop make Goodyear tires in South Africa, and the mere fact that such reports gain credence indicates a growing freemasonry among tire companies.

EMBOSSING ROLL. Engraving embossing rolls for calendering plastic materials has been limited to patterns in which the designs were extremely shallow. Where it was necessary deeply to emboss sheets and maintain accuracy of design, such embossing was accomplished by flat dies or molds.

By a new invention deeply embossed designs may be calendered by embossing rolls on which the design is deeply engraved in distorted forms so that the internal strains of calendering are relieved as the material cools and the resulting shrinkage brings the heavily embossed design into correct proportions.

Retreading

Curing and Finishing

D. C. McRoberts

Fig. 1. Operating a Lodi Retreading Vulcanizer

SINCE the mechanical operations of the various makes of full circle vulcanizers vary with their design, and, too, since complete and detailed instructions are supplied by each manufacturer as to the operation of his equipment, no attempt will be made in this article to cover mechanical operation details. Similarly, the matter of curing time will be avoided as it must of necessity vary with local conditions and types of repair materials used. This discussion will be confined to such phases of curing and finishing operations that are or can be made common to all shops.

Care of Curing Tubes

Curing tube expense constitutes a substantial overhead item. Knowledge of the characteristics of curing tubes and systematic care in using them will permit holding this expense to its lowest proportions and at the same time will add somewhat to the quality of work produced.

Regular auto tubes can be used except with floating rims, but this practice is not most economical. Tubes of high heat resisting characteristics and of special design are available from most inner tube manufacturers. These occasion higher initial, but lower ultimate expense. Tubes for use with floating rims should be obtained according to the recommendations of the rim manufacturers.

The greatest number of heats will be obtained from a tube that is used only in tire-size groups which cause the least distortion. It should be remembered that a rubber compound takes a permanent set with continued curing. Excessive stretching or unusual distortion causes immediate impairment, if not absolute destruction, of a tube after numerous cures.

[1] India Rubber World, Oct. 1, 1934, p. 36.
[2] *Ibid.*, Sept. 1, 1934, pp. 39-42.

Inserting and Removing Tube

Any method of applying a tube into or removing it from a casing is abusive because it involves bending and distortion. Attention, therefore, should be directed to avoiding unnecessary extremes of these conditions. Crushing the tube laterally and scruffing it between the beads can be avoided by utilizing any type of full bead expander[1]; moreover this practice also permits insertion and removal of the tube with the least amount of circumferential "breaking."

New Type of Spreader

A spreader is now available that is particularly suited to inserting and removing tubes and floating rims in that it spreads the tire while in a horizontal position. It consists of a rigid table with four adjustable hooks to hold the lower bead of any size of tire in a stationary position; while the upper bead is gripped by four hooks attached with chains to a strong metal frame, which is suspended from a chain hoist.

Special Precautions

Bending or breaking the curing tube in the region of the valve base should always be avoided as this is a most vulnerable part of the construction. The valve stem should never be used as a handle for removing, inserting, or carrying the tube. It is a device for inflating, retaining, and releasing air pressure and should be confined to those functions only. Submersion tests should be applied to the tube after each period of use as a precaution against slow leaks spoiling the next tire to be cured. Until the life of the tube is practically spent, leaks ordinarily occur around the valve stem and can be stopped by slight tight-

ening of the lock nut. When not in use, curing tubes should contain enough air just to keep them shaped, not stretched. This condition prevents injurious folds and wrinkles that are inevitable if tubes are stored in a deflated condition. It is best to hang them from a rack or wall bracket, preferably one with a wide curved top, that will hold the slightly inflated tube in a natural circular position. It is perhaps superfluous to mention that either the tube or the casing inside should be well dusted with soapstone before assembling the two, but failure to do this dusting permits the two to adhere sufficiently that the tube is definitely harmed because of the difficulties of removal.

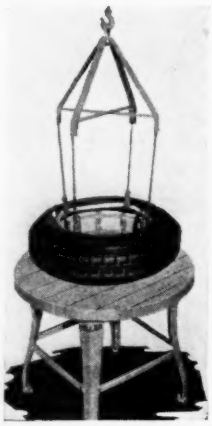


Fig. 2. Miller Chain Block Spreader.

Matrix Size and Adjustment

It has been previously explained that the development of full circle retreaders caused retreading to become an established business.[2] Not only because such vulcanizers were full circle did they prove meritorious, but also because of their features of adjustability. The various makes have a variety of matrices and spacing rings for the accommodation of the many sizes of tires and the variations of dimensions that occur in each marked size.

Each equipment manufacturer supplies instructions regarding the grouping of marked tire sizes that will be accommodated by each matrix and matrix-spacer ring combination. In addition to these instructions the operator's judgment must be utilized.

Fig. 3. Inserting the Curing Tube

Fig. 4. Removing the Curing Tube

This can be done best by realizing that in general the matrix is designed to fit the overall diameter of the tire; while the spacer rings provide adjustments to accommodate the varying cross-sectional widths of casings. Undue distortion of carcasses during cure, improper flowing to fill tread design, and unsightly mold marking of the sidewalls can be avoided by calipering the outside diameter of the built-up tire and the width of its cross-section, then selecting a matrix equaling the former and fit with spacers to equal the latter. Side rings should be selected or adjusted to eliminate any bulging of the casing adjacent to the inner edge of the mold, forcing any such bulge to the bead region where it is not affected by heat.

Perfect Molding

Improper flowing of the stock results in imperfectly molded tread designs, either in spots or completely around the tire. The former is usually due to air trapped in the mold; while the latter comes from either insufficient internal pressure or using the wrong matrix. Trapped air will usually be avoided either by lubricating the hot mold by brushing it with a soap solution made by dissolving castile or ivory soap in water, or dusting tire or mold with soapstone. In either event the air finds passages through which it can escape from the mold pocket as the rubber flows in more readily to replace it.

Temperature of Mold

Rubber cures in the presence of temperature. Steam pressure is not an expression of temperature although dry steam does have a definite temperature equivalent for any given pressure. Mistakes of cure very frequently occur because vulcanizers are fitted with steam pressure gages instead of thermometers. Pressure gages are seldom correct, and strange as it may seem, the degree of error is not constant from day to day or is it always in the same direction. The correct name is "Steam Indicating Gage," and it should never be relied upon to do more than the name implies. Even when it correctly measures the steam pressure, there is constant danger of improper cure because of low quality steam. If the trap is constantly vented, the operator can be reasonably sure of steam quality by observing whether or not water comes from the vent although a portion of the mold may become waterlogged and cool without this evidence. A thermometer tells the story with certainty and should always be used whether in conjunction with a gage or not. Most complaints against the curing habit of repair materials are traceable to this cause, seldom the gum.

Finishing the Tire

Upon removal from the mold the overflow should be trimmed from the tread edge, then rag buffed or emeryed to a smooth surface. Following final inspection to be sure of perfection, the inside of the casing should be given a heavy coat of white lubricating soapstone paint and the outside painted from bead to bead with a black lustrous tire paint. The appearance effect is practically that of a new tire, and high mileage per dollar should be the service expectancy.

Oil Resisting Flooring

OWING to the fact that many rubber floors are waxed and most waxes contain oil such as turpentine, which is a solvent of rubber, the following test that will prove whether a rubber flooring is oil resisting is of interest. Take an empty one-pound tin, such as a coffee can; make a disk of rubber flooring that will fit in the bottom with enough play to allow it to be removed. Place upon the rubber disk a piece of ordinary putty so that it will come within ½-inch from the edge of the rubber and about 1½ inches high in the center. The putty contains linseed oil, but not a great amount. Then put the cover on the can and place the latter in a room having a temperature of 72° F., and let the can stand from four to six weeks. If no trace of pin holes or irregularities shows on the surface of the rubber flooring, it contains an oil resisting chemical.

The Foreman's Job

The Control of Costs and Quality

G. F. Buxton [1]

AS SUGGESTED in "An Analysis of Foremanship Responsibilities,"[2] a foreman has many types of responsibility. Several of these have been named. One is that of "Control"—the control of conditions affecting the production of goods in his department and the control of the product itself.

This article discusses a number of matters for which the foreman is in part responsible. First he must watch the controllable costs in his department, doing all that he can to see that the goods are produced economically. Equally important, he must inspect the product as it is being manufactured in order to keep it up to a predetermined standard of quality. Then he must see that the prescribed speed of operations is being followed so that he will meet his daily quota. He must usually see that machines are kept in repair and that set-ups and new adjustments are checked.

Discussed here in the following order are these four "Control" features: Departmental Costs and Cost Control; Product Quality and Quality Control; Standard Speed; Working Conditions, including Tool Maintenance and Making Improvements. Some phases of each of these features of the foreman's job affect directly the success of production operations in the rubber industry.

Departmental Costs

Foremen sometimes fail to realize that while many problems are faced by the management of an industrial plant, one item must ordinarily be uppermost. The basic idea in any business is that of making a financial success, which means ultimately a satisfactory profit for the men whose money is invested in the undertaking.

People talk about a service to the public through supplying the public with a product which it wants. Industry must do that thing. The local community values a factory largely in terms of its ability to keep many employes steadily at work. Industry tries to do that employing. The government sees in a manufacturing establishment a source of taxes for the support of governmental activities. Industry pays a considerable share of taxes.

A company is interested in meeting all these demands and many more. But its one permanent problem is that of making a profit on the investment. If it cannot make a profit, it cannot do any of these other things. It must control its manufacturing costs. After all bills are paid and all overhead charges figured, there must still be a safe margin between such total cost and the price received from the customer.

The foreman must be sold to this idea, and he must recognize the importance of helping produce goods economically. Part of his job is to know the various ways of practicing this economy. He can prevent many of the mistakes and stop many of the losses which would otherwise be chargeable to his department. Such unnecessary expenses may be due to his own laziness or to his lack of ability in supervising activities in his department. Some of the possible losses may be named.

Cost Control

Losses are sometimes due to mistakes in using the wrong materials in getting out a production order. Carelessness in weighing or in checking quantities or in missing what may seem like an unimportant item in time or temperature specifications may spoil a batch of rubber or a large number of molded articles. If these mistakes are caught early enough, merely a delay may arise in getting out the work, making it necessary to do a part over. But in any case such mistakes add to the cost of completing the production order.

Costly mistakes in different manufacturing departments may be caused by using the wrong materials, wrong quantities, or the wrong finished items in filling a customer's order. In some lines of work in the rubber industry it is imperative that materials be carefully protected during the manufacturing process, keeping them free from contamination with injurious materials. A part of a foreman's control of costs lies in keeping stock and miscellaneous partially processed parts clean and properly accounted for.

Again, losses may be due to a failure on the part of the foreman to follow production orders exactly as specified or fully to conform to standard practice. Not being familiar with the whole story back of an order, the peculiar desires of the customer, the plans of the engineering department, or the difficulties faced by purchasing or warehousing departments, he may attempt to modify the expected routine. The results may antagonize the customer, defeat the purpose of the engineers, or embarrass those who are keeping purchases and stocks at the right level. Conformity to standard practice may be a large element in production economy.

On the other hand, there may be losses due to too close conformity to previous standard practice. A foreman should use his head. There may be potential losses due to a failure to improve production methods. A foreman may be in position to see inefficiencies not readily observed by others. The company may be failing to make a success because changes are needed in his department and he has so far made no recommendations. His own ideas might be welcomed by the tool design or maintenance departments.

Inspecting the work going through its various stages and watching the percentage of spoiled work appearing make up a considerable part of the foreman's activities in controlling costs. Spoiled work and salvage operations cost money, and cutting down on the need of such items is a mark of good foremanship. Whether a poor product may be due to poor materials, to tools out of adjustment, or to careless workmanship, the foreman's job is to keep such losses down to a minimum.

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[1] Professor of industrial training, Purdue University, Lafayette, Ind.
[2] India Rubber World, Mar. 1, 1935, pp. 39-41.

Other economies which a foreman watches have to do with the best use of heat, power, electricity, and many kinds of supplies needed in the shop. He also keeps the shop equipment working to capacity, as far as possible, recommending additional equipment only when the best distribution of the present machine load fails to get out the product on time.

He also keeps the right number of employes on his payroll, recognizing the production losses due to an inadequate personnel and the drain on the company's financial resources for unnecessary wages when too many employes are engaged. Another part of the controllable cost in the personnel column has to do with the proper training of the worker, holding his interest, and getting his best efforts. But personnel problems will be discussed more fully in a later article.

Product Quality

A company's present success and its entire future are tied up with its ability to maintain a standard quality in its product. Preserving this uniformity, upon which customers count, is dependent upon the efforts of the various foremen. It is usually desirable that they have the customer's requirements in mind as they supervise production. Some customers emphasize the need of special care in selected features of the product. From their standpoint this emphasis represents an important mark of quality. The foreman has these requirements clearly impressed upon the minds of his workers. Despite turning out a good standard product, the company may lose a good customer by missing the special feature he wants incorporated.

In general, the foreman watches the quality which the company prescribes as standard. He makes an effort to keep it as high grade as possible, within the established cost limitations. He guards especially those characteristics which tend to give recognized values to the product. This dependable quality keeps customers sending in future orders. A foreman's job is to keep the quality up and the cost down.

Quality Control

Inspection for quality means inspection for many predetermined qualities. Sometimes such inspection is made more certain by listing all points subject to examination, indicating those requiring special attention. A foreman makes sure that his workers are on the watch at all times for mistakes. He trains them to catch bad workmanship and to recognize bad quality in raw materials. Mistakes caught in the compounding room make less trouble than when caught later in the process. Workers are trained to watch the work progressing through the department and check it as it goes from operator to operator and to the next department.

A foreman spends considerable time, directly or indirectly, inspecting for quality of work. A part of this is close-up examination, watching for small but necessary details. Another part of this check on quality may be classed as casual or distant observation, seen five or ten feet away as the foreman walks through the section of the plant for which he is responsible. Good foremanship keeps a good balance between the close-up and the more distant observation. Both types are necessary in a rubber factory.

A part of the control of quality may be shifted to the laboratory. Another part may be assumed by a separate inspection department. But the foreman is never free from the job of producing, examining, and delivering a proper quality of work to the next producing department, to the shipping room, or to the warehouse. Wherever the final check on quality is made, it is very important that mistakes be caught and corrected before the job is delivered to the customer. The customer is the hardest hearted, most unsympathetic, and most costly inspector who examines the product. A well-made article is sometimes shipped to the customer in an unsatisfactory package. The packing and shipping rooms in some phases of the rubber industry help to create and preserve a quality article. Foremen in these parts of the plant realize this point.

Standard Speed

Of equal importance with the control of quality is the control of the time element in getting out the product and starting it on its way. The foreman is assigned the duty of keeping up a continuous flow of production, of getting out his part of the work on schedule. The company's promised deliveries and its figuring of costs are based upon an expected rate of operations throughout the plant. Keeping up with the schedule is dependent upon the maintenance of equipment, checking of orders and materials, instruction of operators, and inspection of the product on the part of the foreman.

The smooth flow of work through the various machines and bench stations is also dependent upon planning in advance for new jobs, and especially for tomorrow's job. Keeping in mind probable delays and taking steps to prevent them are characteristics of good management on the part of the foreman. As a foreman becomes used to conditions in his department, he gets to know the danger points and can prevent delays and mistakes.

In noting, then, the opportunities for "control" we may add to the list the control of quantity along with that of quality. Producing the proper number of units each day is a major responsibility for a foreman. He must meet his quota of such units or parts of such units, or the company's plans will be thrown out of balance.

Working Conditions

Another element of control for the foreman is that of the shop itself, its machines, special tools, and other equipment. Regardless of the work of the maintenance department, the production foreman must do his part to keep the physical conditions always adequate for the work being routed his way. He is in position to observe conditions in the shop and to report them or to get them fixed himself promptly so as not to interfere with manufacturing operations.

We may examine the responsibilities in connection with maintaining good working conditions from two angles. The first is that of keeping the place clean and in order, with tools and machines in good repair and properly adjusted for their work. The second is that of improving shop conditions.

Tool Maintenance

Let us look, then, at the idea of "keeping things from getting any worse." Tools wear out; they get out of adjustment; they get dirty; and some things in the shop are misplaced. A foreman watches the smoothness and steadiness of the machinery. He assures himself that bearings are well lubricated, that parts are properly tightened, that cutting edges are properly sharpened, and that new set-ups are properly checked. He does this work himself, or he delegates it to someone who can be relied upon to do it.

He realizes that the regular inspection of equipment is the best insurance which will guarantee continued operation. If there are new attachments or new tools which will be needed at an early date, he requisitions them far enough in advance to be sure of having them when

needed. If there are dies or molds or cutters which will be required for standard products, he has them put in condition for use in a new job as soon as they are relieved from the old job. He knows which ones should be provided in duplicate or, perhaps, in considerable numbers, and he has them ready.

Along with the upkeep and repairs of tools and machines, a foreman learns the value of appropriate cleanliness. He knows the places where cleanliness counts most in the finished goods. He discovers the best ways of cleaning both equipment and product and he sees that the work is done satisfactorily. He takes a pride in a clean shop, feeling that there may be suggestion to workers through this environment to take a pride in careful workmanship.

The idea of keeping the shop in order also appeals to many foremen. Keeping things where they belong saves time looking for them when wanted. This policy eliminates some types of interruption with the normal movement of production. It makes more space available for work. A foreman sometimes finds a better, more convenient place to store materials and small tools. He may arrange facilities more adequately adapted to their purpose and more easy of access. He may realize, however, that no system will run itself. He needs to insist upon having the workers put things back as soon as they are through using them. He may need to help them to establish systematic habits of taking care of things, as a part of production operations. Orderliness is, at times, nearly as important as good workmanship.

Keeping the shop in order means many different things, such as keeping trucks or conveyers working effectively, avoiding congestion of materials at any given point. This practice means seeing that materials arrive when needed and leave when nothing more is to be done with them in the department. It may mean providing a more convenient way of getting rid of damaged or spoiled work, trimmings, and other parts which cannot be used in the product going through the plant at the time. It may mean finding a more satisfactory way of taking care of the "paper" part of the job—production orders, specifications or formulas, requisitions, and other record material. Sometimes such papers get soiled or lost or are not accessible when needed, and a better scheme may be devised for handling them.

Making Improvements

Besides "keeping things from getting any worse," a foreman has many opportunities for improving conditions. Better ways are constantly being found for making an old product in the rubber industry, and new and better goods are being planned all the time. The foreman in a production department is not directly concerned with making such improvements, but he has many occasions for making suggestions which will develop into improvements in methods or results.

Every machine, every method, and every product is subject to possible improvement, and the foreman may be interested in any changes which indicate such progress. In fact, any manufacturing establishment which fails to keep abreast with the march of progress may disappear from the picture and have its place taken by a more progressive company. Sometimes we find the good factory of yesterday has become a back number today. It has failed to keep alive to changes taking place around it.

Changes may enable the worker to do a better job with the same outlay of energy, time, and unit cost, getting a more uniform quality, a higher grade article, or making a smaller percentage of spoiled work.

Changes may enable the worker to do an equally good job quicker, producing more units per day because of improved tools or methods.

Changes may enable the worker to do the same job—no better and no quicker—but with less effort, in a less hazardous manner, with more bodily comfort, or with a greater feeling of satisfaction.

Changes may enable the worker to do the job with less wear and tear upon the tools and equipment, requiring less outlay on repairs and a longer delayed replacement.

Such changes may be proposed by the foreman as the man closest to production in his department. He may be the one to realize most fully what are the most annoying and inadequate facilities. He knows what tools sometimes fail to work, what ones need more speed, what ones are dangerous. He knows what places are poorly lighted or poorly ventilated, too hot or too cold, too dry or too moist.

In most plants a foreman has an opportunity to contribute practical suggestions for improving the product without involving extensive production difficulties. His ideas may tend, if adopted by the company, to improve the quality, the color, or the appearance of finished rubber goods.

It is usually true, in the larger plants at least, that suggestions for improvements come from someone outside of the department. The foreman is so familiar with things as they are that he does not always realize that they can be any different. And he is so busy getting out production that he does not take time to work out improvements. Sometimes, however, he does suggest changes which are of great value to the company.

For the sake of preserving a loyal interest in the company and a confidence in the company's ability to handle its production successfully, it is well for a foreman not to become overcritical. He may easily develop a habit of looking for bad conditions and fail to notice good conditions. He may become a knocker instead of a booster. Constructive suggestions are desirable. Destructive criticism and fault-finding are undesirable.

Para-Graphs

(*Continued from page* 34)

development is the latex formulation that produces an unusual stability necessary to prevent coagulation, a protection against colloidal decomposition to avoid violent explosions, an exceptional fiber wetting property to reduce the frictional hindrance of penetrating dense textile structures, and a gas forming characteristic that will provide passages for the final elimination of moisture from the depths of the impregnated article when subjected to moderate heat.

Specific Volume of Rubber-Sulphur Compounds. The values of the specific volumes were obtained from measurements of the changes in lengths of rubber rods as the various pressures were applied. The changes in length were obtained by observing, with a microscope, a scale which had been fastened to the end of the rod when the other end was rigidly held. The specific volume was found to be a function of the pressure, temperature, and sulphur content. It decreased with pressure and sulphur content and increased with temperature. The compressibility of the soft rubber specimens was found to be about three times that of the hard rubber specimens. The volume thermal expansivity decreased with both the pressure and sulphur content. The soft rubber specimens had a volume expansivity about three times that of the hard rubber specimens.

EDITORIALS

Fundamental Research

WHEN Dr. Compton, president of the Massachusetts Institute of Technology, expressed chagrin in a recent speech at Yale University that the United States had done so little in scientific research in comparison with other countries, he overlooked the rubber industry.

Fundamental research in the chemical and technical development of rubber materials and finished products has been actively pursued by the principal rubber companies during the depression. In fact one company is now employing more research men than at any previous period in the history of the concern. In the laboratory of another large manufacturer a staff of competent men are constantly working on fillers, the structure of rubber, and other scientific problems. Research organizations have been maintained throughout the depression and have accomplished as much development as could be naturally expected in normal times. The marked progress made by rubber scientists in recent years is signalized by the many new chemicals and rubber products which have appeared in commercial forms.

Executives of the industry have never faltered in their belief that fundamental research is supremely important, and it is a well-established fact that laboratory staffs devote considerable time and effort to this subject.

There are many examples of what science has done to uplift the rubber industry by creating new chemicals and processes. But only one will be cited, and that is the perfection of a material which began with Dr. J. Nieuwland's experiments and culminated in a commercial synthetic rubber that was perfected by du Pont chemists under the direction of Dr. Wallace H. Carothers.

If the price of rubber should be increased to war-time figures, we would owe our freedom from domination of foreign planters to fundamental research.

The Wagner-Lewis Bill

INCORPORATED in the Wagner-Lewis "social security" bill now before Congress are payroll tax provisions that will result in actually reducing purchasing power, advance prices, and increase unemployment, according to a recent survey[1] of this legislation.

It is emphasized that the wage earners' share of values produced by manufacture has remained constant for years, and legislators are cautioned against the harm resulting from attempts to interfere with economic law.

"The significance of the uniform share paid to labor should not be overlooked. Nothing has been able to change it—good times, bad times, legislation, union activities, and even the NRA (admittedly designed to increase the wage earners' share of values produced) failed utterly. Labor still receives just 36.3% of total values added by manufacture."

The authors point out that the manufacturer can do only two things about the proposed payroll tax—pay it and reduce wage rates by the amount of the tax or make no reduction in wage rates, but increase prices, thus reducing demand and employment. The payroll tax positively cannot be absorbed by industry.

The inability of industry to absorb the payroll tax is seen when the 1933 Treasury reports are analyzed: 68% of the companies reported a total deficit of $966,175,171; while only 32% of the companies reported some profit. For these 68% of the companies, or more than two-thirds, the payroll tax would mean $212,000,000 additional loss and would unquestionably result in shutting down some plants, going out of business for others, and thus decrease employment still further—the very thing the tax was designed to prevent.

The real basis of security is the productivity of enterprise and a greater production and consumption of physical goods, based on a true balance of wages, prices, and costs, enabling a higher standard of living.

The following program is offered as a sound basis of social security:

Relieve manufacturers of the fixed wage rates burden in order that they may adjust production costs and prices to the point where maximum demand is stimulated.

Permit flexible working hours in order that each industry may develop its maximum efficiency of low-cost production.

Encourage industry to increase the productivity of its workers (and thereby their *annual* wage) by investing capital in improved processes and equipment.

Encourage investors to supply capital to industry by removing artificial hazards and inspiring confidence in the possibility of reasonable profit.

[1] "Social Security—The Great Delusion," Allen W. Rucker and N. W. Pickering (Copyright), Farrel-Birmingham Co., Ansonia, Conn.

ARE YOUR FOREMEN READING THE HELPFUL AND INTERESTING series of articles on "The Foreman's Job" now running in this magazine? If not, it will be to your advantage to subscribe for copies for your men.

What the Rubber Chemists Are Doing

A Shearing Disk Plastometer for Unvulcanized Rubber

Melvin Mooney[1]

THIS excerpt from the author's paper[2] describes the construction and operation of a shearing disk plastometer with which a complete plasticity measurement, including heating the sample, can be made in three minutes. The measurement obtained, called the shearing viscosity, is proportional to the mean absolute viscosity of the sample.

An ideal plastometer for unvulcanized rubber would give a precise measurement of plasticity, would complete a measurement in thirty seconds or less, and would be sufficiently simple in operation to be used by an unskilled millhand. Preliminary experiments proved that two conditions are necessary in an instrument to produce shearing in a rubber sample and prevent slipping at the surfaces. The tangentially moving surfaces in contact with the rubber must be sharply corrugated or otherwise roughened, and the rubber must be subjected to a confining pressure which holds it in intimate contact with the roughened surfaces. A simple hydrostatic pressure, supplied, for example, by a pump acting on a liquid, would not suffice for the second requirement. The pressure must be confining in the sense that it is applied directly to the rubber by mechanical means which force and hold the rubber in place and at the same time permit air to escape.

In accordance with the above principles two successful shearing plastometers have been developed, one in the cylindrical form and one in what is essentially the disk form. The cylindrical form is used primarily for research work of a special character. The disk form is used for general plasticity work in both laboratory and factory, and it is this form that is described here. Its essential parts are shown in the diagram.

The roughened surfaces between which the rubber is sheared consist of the disk-shaped rotor, 1, and the upper and lower halves of the stator, 2 and 3. The two halves of the stator have the shape of shallow circular cups and, when held with their brims in contact, form together a closed cylindrical chamber. The rotor is held vertically centered in the stator chamber by means of a shoulder on the rotor shaft

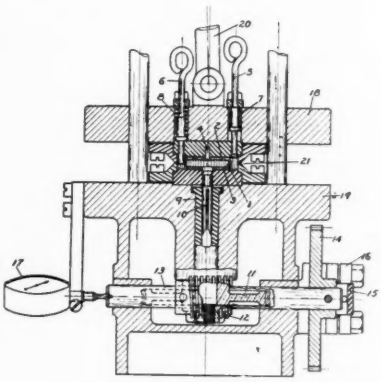


Fig. 1. Diagram of Plastometer

and by the pin, 4, in the center of the chamber roof. The top and bottom surfaces of both rotor and stator are covered with a rectangular array of sharp points, produced by cross-hatching the surface with shallow V-shaped grooves. The sides of both rotor and stator are similarly covered with sharp ridges, produced by a series of longitudinal V-cuts. The device for maintaining pressure on the rubber consists of the pair of plungers, 5 and 6, forced downward by springs 7 and 8.

The shaft of the rotor, extending through a hole in the floor of the stator chamber, fits into the spindle, 9, and is slotted to receive the key, 10, in the spindle. The spindle carries the worm gear, 11, which engages with the worm, 12, mounted on horizontal shaft 13. The spur gear, 14, mounted on the end of shaft 13, engages with a pinion on the shaft of a synchronous alternating current motor not shown in the figure. Shaft 13 is free to move longitudinally in its bearings, as well as to rotate, but its horizontal travel is opposed by the leaf spring, 15, supported in clamp 16. The horizontal travel of the shaft, which is equal to the deflection of the spring, is indicated by the micrometer gage, 17. The upper and lower platens, 18 and 19, can be heated by either steam or electricity; and each platen has a thermometer hole for measuring the temperature in the center of the platen. The upper platen can be moved vertically by means of a double lever system operating through the connecting rod, 20. One of the two levers gives a relatively large travel and low mechanical advantage. The other lever gives a small travel and an enormous mechanical advantage in the position where the two halves of the stator chamber are closing together.

The speed of the rotor is 2 r.p.m. The pressure exerted by plungers 5 and 6 is 400 to 800 pounds per square inch. Any deviations from the standard frequency in the alternating current supply to the synchronous motor would cause corresponding deviations from the standard speed of the rotor; but the frequency control in modern electric generators is generally quite accurate enough for the shearing plastometer. The temperature adopted as standard for plasticity measurements is 100° C. Spring 15 is adjusted in clamp 16 so as to give a gage reading of 100 under a force of 40 pounds while the plastometer is running empty. During calibration this force is produced by a weight attached temporarily to the spring.

When the upper platen is raised, the rotor and shaft can be lifted out. The rotor disk and the inside of the stator are brushed with a soap solution to prevent excessive sticking of the rubber. After the soap has dried, a slab of rubber is placed above and below the rotor; the lower slab is pierced or cut to receive the rotor shaft. The rotor is placed in position and the plastometer closed to allow the rubber to warm up for a period of one minute. The motor is then turned on. As the rotor begins to turn in the rubber, thereby shearing it, the rubber exerts an opposing torque on the rotor, which in turn transmits a horizontal thrust to shaft 13. This thrust causes the shaft to push against spring 15, thereby deflecting it; and the deflection is registered by gage 17.

Plungers 5 and 6, pressing continuously on the rubber, finally compact it, and the reading rises to a constant value. Whether air is in the sample or not, the reading generally reaches a substantially constant value within one minute after the motor is turned on. This constant gage reading is proportional to the stiffness or the viscosity of the rubber and is called its "shearing viscosity."

[1] United States Rubber Co., Passaic, N. J.
[2] *Ind. Eng. Chem.* (Anal. Ed.), Mar. 15, 1934, pp. 147-51.

A. C. S. Meetings

THE eighty-ninth meeting of the American Chemical Society will be held April 22 to 27, 1935, in New York, N. Y., with the Pennsylvania Hotel as headquarters. This event celebrates the three-hundredth anniversary of the founding of the chemical industries of America, in which the Manufacturing Chemists Association, the Synthetic Organic Chemical Association, and the chemical societies of the metropolitan district will participate. A symposium will be held on April 24, planned to interpret the close relation between the chemical industries and the national welfare. On April 25 will be a symposium on the economic problems of the chemical industry.

A third symposium will be devoted to materials of construction in the building industry. The chairman will be Prof. James R. Withrow, of Ohio State University. A group of papers will outline the latest developments in new materials of construction important to the chemical industries. These papers will cover a wide range of materials, including metals, ceramics, plastics, rubber, and alloys.

Sessions are scheduled by the Society's nineteen professional divisions. On Tuesday evening, April 23, the William H. Nichols medal of the New York Section of the American Chemical Society will be bestowed upon Father Julius A. Nieuwland, of Notre Dame University.

Rubber Division Activities

The program of plant visitations arranged for members of the Rubber Division during the week of the New York meeting is in charge of R. H. Gerke, United States Rubber Co., Passaic, N. J. The plants open to visitors are U. S. Rubber Products, Inc., Passaic, N. J.; Raybestos-Manhattan, Inc., Manhattan Division, Passaic; and the Okonite Co., manufacturer of Okonite products, wires, cables, and tapes. Limited to 300 persons. It will probably be necessary to make a charge of 50¢ for this trip.

To make certain that you will be included with your division, it is suggested that you communicate with your divisional representative on the Plant Visits Committee. To make advance registration for the general trips or for further information about the plan and procedure outlined here, address the committee chairman, S. D. Kirkpatrick, 24th floor, 330 W. 42nd St., New York, N. Y.

The Rubber Division, A. C. S., will hold four sessions, April 22 and 23, at the Hotel New Yorker. The subscription dinner will be on the evening of April 22; the hour and the place will be announced later. Following are abstracts of the papers to be read at the Rubber Division sessions.

Abstracts

The Carbon and Hydrogen Content of Hard Rubber. Carbon and hydrogen analyses of four samples of hard rubber are given. Sulphur apparently adds to the rubber hydrocarbon until saturation is complete before any substitution takes place, provided proper vulcanizing conditions are maintained. It is pointed out that the carbon-hydrogen ratio is one of the best indications of substitution by sulphur. Harry L. Fisher and Y. Schubert.

The Molecular Weights of Natural and Synthetic Rubber by the Svedberg Ultracentrifuge. The molecular weights of ether-soluble sol rubbers prepared at the Bureau of Standards and of polychloroprenes have been found to be several hundred thousand by means of the Svedberg ultracentrifuge. As solvents, ethyl ether was used for the rubbers and *n*-butyl chloride for the polychloroprenes. The intrinsic viscosities in the same solvents were found to be proportional to the molecular weights, the constant of proportionality being approximately the same for both rubber and polychloroprene. The molecular weights as determined in the ultracentrifuge are several times as great as Staudinger's viscosity values. Elmer O. Kraemer and William D. Lansing.

The Permeation of Propane and Commercial Butane through Rubber, Rubber-DuPrene, and DuPrene Compounds. Of the rubber compounds, those of the oil- and gasoline-resisting type, in which the rubber by volume is low, are most resistant to permeation of liquefied gases, such as propane and butane. An improvement in the resistance to permeation is obtained by substituting DuPrene for rubber, with the maximum resistance being obtained when DuPrene is substituted for all of the plastic material. The increase in resistance to permeation of propane and butane is a direct function of the ratio of DuPrene to rubber between the limits of 1:4 and 3:4. The increase of resistance to permeation is a direct function of the thickness of the material being permeated. Tubing machine grain has no effect upon the rate of permeation. Elongations of 10 to 12% have no effect upon the rate of permeation. Commercial butane (8% propane and 92% of a mixture of normal and isobutane) is more penetrating than propane. G. C. Maassen.

Mixed Reenforcing Pigments in Rubber. I. Effect of Binary Mixtures of Zinc Oxide, Channel Black, and Clay on the Physical Properties. Zinc oxide-channel black, zinc oxide-clay, and clay-channel black mixtures in rubber at low and moderate loadings produced modulus and tensile properties which were additive or which conformed to the ideal mixture law for two-component mixtures. These results agree substantially with those of Beaver and MacKay. At loadings far in excess of those required for maximum tensile reenforcement, deviations from the additive effects were found. A three-dimensional or space diagram has been found very useful in studying the relation between the properties and compositions of rubber-pigment mixtures. O. D. Cole.

Heats of Reaction of the System: Rubber-Sulphur. Heats of reaction of rubber with sulphur to form vulcanized compounds having empirical formulas lying between C_5H_8 and C_5H_8S (0 to 32 weight % of sulphur) were determined directly at 175° C. in an isothermal calorimeter which consisted essentially of an insulated copper block to which heat could be added with electrical energy or removed by adding cold steel balls. In a reaction experiment, the mixture of rubber and sulphur was placed in a cavity in the copper block and the temperature of the block was maintained constant by the addition or removal of measured quantities of heat energy until the reaction of vulcanization was complete. Differences in heat content between 25° and 175° C. ($H_{175}-H_{25}$), for unvulcanized mixtures and vulcanized compounds of rubber and sulphur, were determined in the same calorimeter by dropping the sample at 25° C. into the calorimeter at 175° C. For vulcanized compounds of rubber and sulphur, empirical formula C_5H_8Sx,

$$(H_{175}-H_{25}) = 22.2 + 1.2x$$

kilojoules per gram-mole of C_5H_8 in the range from $x = 0$ to $x = 0.5$, and

$$(H_{175}-H_{25}) = 24.1 - 2.6x$$

in the range from $x = 0.5$ to $x = 1.0$, where x is the number of atoms of sulphur per C_5H_8 and varies from 0 to 1.0. For unvulcanized mixtures of rubber and sulphur ($C_5H_8 - x\,S$),

$$(H_{175}-H_{25}) = 22.2 + 6.2x$$

kilojoules per gram-mole of C_5H_8. The heat of the reaction of rubber with sulphur, which for the sake of simplicity may be represented as C_5H_8 (solid) + x S (solid) = C_5H_8Sx (solid), was found to be linear with x from $x = 0$ to $x = 0.5$, at which point there is a discontinuity in the slope of the curve; and also linear with a different slope for the range $x = 0.5$ to $x = 1.0$. In the composition range $x = 0$ to $x = 0.5$, the increases in heat content for the reaction of vulcanization at 175° and 25° C. are, respectively,

$$\Delta H_{175} = -60.0x, \text{ and}$$
$$\Delta H_{25} = -55.4x$$

kilojoules per gram-mole of C_5H_8. In the range $x = 0.5$ to $x = 1.0$

$$\Delta H_{175} = -22.5 - 15.0x, \text{ and}$$
$$\Delta H_{25} = -24.8 - 5.8x$$

kilojoules per gram-mole of C_5H_8. A. T. McPherson and Norman Bekkedahl.

A Fatigue Cracking Test for Tire Tread Compounds and Some of the Laws of Fatigue. One of the reasons for using rubber in tires is the unusual resistance of rubber to fatigue. The

quantitative measurement of resistance to fatigue cracking is therefore of importance as an aid in the development of tread compounds and in tire design. A new laboratory test for evaluating the resistance to fatigue cracking of tire tread stocks is described. The precision of the strain cycle, the quantitative measurement of the degree of cracking, and the initiation of the cracks with ozone are novel features which enhance the validity of the test. Data are given which show that ozone cracking and fatigue cracking are additive, that the rate of growth of cracks is a function of the maximum strain, that endurance limits may exist, and that the addition of antioxidants decreases the rate of growth of cracks and raises the endurance limit. The test has been found to correlate with shoulder cracking in tires. E. T. Rainier and R. H. Gerke.

Consumers' Crude Rubber Requirements. In a brief way, the more important requirements of crude rubber consumers have been discussed, giving the reason for their desirability or necessity. They are: 1. uniform rate of cure; 2. uniform age resistance; 3. cleanliness; 4. freedom from deleterious substances; 5. freedom from added unnecessary materials; 6. uniform plasticity; 7. soft rubber; 8. better packaging; 9. lower water absorption; 10. light-colored sheet rubber. Consideration has been given the need of the improvements, and formulas suggested for testing the properties discussed, where these properties have been studied for some time. The desirability of closer cooperation between producer and consumer is brought out, and the hope is expressed that the present discussion will at least aid in bringing about a unification of ideas along the lines mentioned so that an orderly program of research can be evolved by those interests close to the producer. George A. Sackett.

Reenforcement of Rubber by Pigments. I. Effect of Moisture on Measurements of Heat of Wetting of Gas Blacks. Earlier work on hydrophilic solids had substantially proved that the effect of the presence of small amounts of polar impurities in nonpolar liquids was an important factor in heat of wetting determinations. The present investigation shows that the presence of moisture (a polar substance) in benzene (a nonpolar liquid) has a pronounced effect on the heat of wetting values determined with rubber gas blacks, although they are most usually considered as being organophilic or hydrophobic. The results prove that to obtain duplicable heat of wetting values, the moisture content of the gas black, as well as of the liquids, must be entirely removed or closely controlled. It was found most difficult to obtain and maintain anhydrous conditions in the calorimeter and its contents preceding and during determinations. Freshly activated charcoal proved to be an efficient drying or clean-up agent for the removal of traces of moisture from the nonpolar liquid in the calorimeter, and the use of this clean-up agent proved most effective in establishing anhydrous conditions. These results show the difficulties encountered in attempting to rate rubber blacks by means of heat of wetting measurements, as has frequently been done in the past. C. W. Walton and H. J. Osterhof.

Treatment of Latex Compounding Wastes. Discharge of wastes from latex compounding into streams is objectionable chiefly from the standpoint of appearance, since these wastes do not contain dangerous bacteria or high amounts of putrescible organic matter. Previous attempts at clarifying compounding wastes by acid coagulation were not satisfactory, because of precipitation of discrete particles of agglomerated latex, fillers, pigments, etc. These are in such form that they cannot be readily screened out. Chemical precipitation using ferrous sulphate (copperas) and flake caustic soda was found to be satisfactory as a means for clarifying these wastes. A rapidly settling precipitate is formed, carrying down with it practically all the suspended solids. Details on operation and cost are given. S. I. Strickhauser.

Studies on the Variability of Plantation Rubber. Nine different accelerators in more or less common commercial use were selected. With each of these accelerators ten distinct lots of each smoked sheets, No. 2 amber crepe, and No. 1 roll brown crepe were tested. Tables of data bring out the degree of variation found: sheets show a marked variation; while the lower grades show still greater variation. None of the accelerators employed eliminated or appreciably reduced this variation. A. E. Warner.

Boston Group

THE next meeting of the Boston Group, Rubber Division, A. C. S., is tentatively set for May 17. Peter P. Pinto, general manager of *The Rubber Age* (New York), will give his lecture on "Strange Patents" illustrated by lantern slides. C. E. Maynard, of Fisk Rubber Corp., Chicopee Falls, Mass., will talk on "Machine and Progress Development."

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., will meet at Hotel Sherman, Chicago, Ill., Friday evening May 10, 1935. H. A. Winkelmann, of The Marbo Products Corp., will discuss "New Developments in Rubber Research." Additional program features will be announced shortly.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A. C. S., will hold a meeting in May, on a date not yet determined, when R. B. Springfield, of the University of Southern California, will speak on "Plastics." The regular spring golf tournament competition for cup and other prizes is scheduled for April 20.

Akron Group

THE spring meeting of the Akron Group, Rubber Division, A. C. S., is scheduled for April 12, 1935, at the Akron City Club. The speaker of the evening will be William B. Wiegand, director of research, Binney & Smith Co., 41 E. 42nd St., New York, N. Y. His subject will be "A Trip to the Far East." Officers for the coming season are to be elected. The special dinner attraction will be the oyster bar in the grill. Dinner will be served at 7.00 p. m. sharp. Tickets at $1.25 can be had from the group secretary, H. A. Hoffman, 1799 W. Market St., Akron, O.

Velvetex

VELVETEX is the softest form of carbon black available. It represents an outstanding development in the production of high-yield black since more is produced from a given volume of gas than with any other type of gas carbon.

Its unusual value as a filler lies in the fact that the addition of 5 to 10% does not appreciably affect the stress-strain figures of the compound. The very slight reenforcement that this black gives is ordinarily just enough to offset the diluting effect of adding the extra filler; so the new stock handles and tests as it did before, but costs 3 to 5% less.

Analysis of Velvetex shows approximately

Fixed carbon	96.4
Volatile	3.5
Acetone	3.0
Moisture	1.0
Ash	.05
Sp. gr.	1.70

The remarkable feature is the high content of fixed carbon, which is higher than certain channel process blacks. The volatile matter and acetone extract are very closely the same both in composition and amount. This extractable matter seems to have a definitely helpful effect as an aid to dispersion of the black in rubber mixes. The particle size is only slightly larger than good-grade zinc oxide and is much smaller than whiting and clay, with which it compares as an economical filler.

Rubber in Linoleum [1]

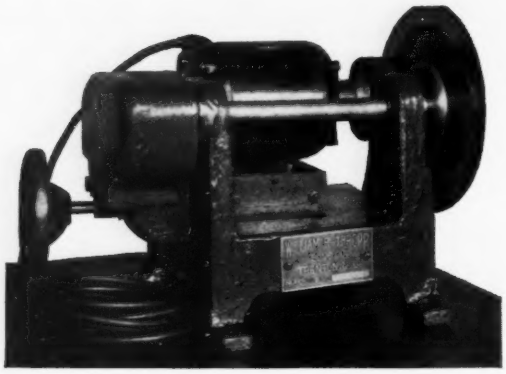
THE investigation of rubber in linoleum conducted by the R.G.A. has been concluded, and two complete reports have been published. The first[2] covers preliminary experiments, and the second[3] deals with the exact procedure to be followed in making "open cured" rubber flooring where vulcanization is procured by imitating the methods of seasoning linoleum. A number of representative mixing-formulae were given,

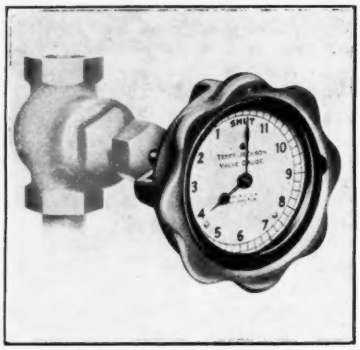
[1] *R.G.A. Bulletin*, Feb., 1935, p. 82.
[2] "Preliminary Experiments for the Incorporation of Rubber in Linoleum." H. P. Stevens, *R.G.A. Bulletin*, Aug., 1932, pp. 452-53.
[3] "A New Type of Rubber Flooring." H. P. and W. H. Stevens, *R.G.A. Bulletin*, Oct., 1933, pp. 537-44.

(*Continued on page* 59)

New Machines and Appliances

Thropp Circular Knife Grinder





Tejax Adjustable Indicator

Knife Grinder

THE motor-driven bench machine pictured in the illustration measures 18 inches long, 14 inches wide, and 16½ inches high. This durably built machine is adapted for grinding circular knives for rubber cutting machines. It is equipped with a ¼ h.p., 110 volt, ball-bearing motor with extension cord. The motor runs 3,450 r.p.m., and the circular knife runs 9 r.p.m. The machine has a 4- by 1½-inch cup-type grinding wheel and will grind cutting disks from 4 to 12 inches in diameter.

This thoroughly dependable and economical piece of special equipment will promptly justify its installation by the speed and accuracy of the work it can accomplish in keeping the edge and bevel of cutting knives keen and true. Wm. R. Thropp & Sons Co., Trenton, N. J.

Valve Position Indicator

THE illustration shows a valve position indicator which tells at a glance whether a valve is shut or how many turns open or what proportion thereof. It operates by a positive gravity mechanism making it applicable to valves, the stems of which are in a horizontal or semi-horizontal position. This indicator is ideal for manual control work as the same setting will give the same result each time the valve is operated. The indicator is adjustable in its own bracket which replaces the regular valve wheel, enabling resetting when the valve wears or when new seat and disk are installed.

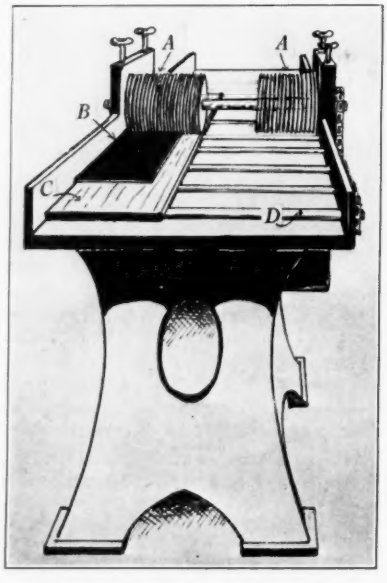
When the large and small hands of the indicator are at "shut," the valve is closed; when the small hand is at "one" and the large hand at "shut," the valve is one turn open, and so on.

Several sizes are available; also special attachments may be had for large valves, rising stem valves, and overhead chain operated valves. Tefft-Jackson, Inc., 29 River St., Pawtucket, R. I.

Rubber Tile Feature Joints

A GOOD many machines are being used to cut joints for rubber tiling. Most of these are of the paper cutter type, use a rule knife, and operate with an automatic device which can be set to any desired width of cut.

The accompanying illustration represents a rubber joint cutter of practical design. *A*, *A* are groups of circular knives spaced on one side of the machine for ¼-inch joints and on the other for ⅛-inch joints; *B* is the rubber sheet to be cut into joints; *C* is a soft wood cutting board free from knots; and *D* are the rollers that convey the material. The speed of *A*, *A* and *D* is the same. *C* rests on rollers *D*. *B* is set snugly against the left side of the machine on the board *C*. The rollers convey the rubber sheet under the circular knives, which cut through the material and slightly into the board. Thus the joints are cut straight and of uniform width.



Rubber Tile Feature Joint Cutter

The material used for joints should be remnants from other cuttings, where possible, to reduce waste. The most popular joints are black, and next, white. The sides of feature joints must be absolutely vertical and smooth. No cement should be used between the joints when laying. It requires a little more than twice as many joints as tiles. The joints are usually made in three-foot lengths to run the long way of the room. The short joints are cut the exact length of the tile to run at right angles.

Rubber tile joints are estimated by weight and not by number; reference is had to tabulations of weight according to length and cross-section of joints. In estimating joints for an installation of six-inch square tiles, twice as many long pieces (three feet each) will be required as the number of tiles, and the same of short pieces (six inches). In addition 2% should be allowed for waste.

If a triple joint job is to be figured, the center joint can be figured as above, but the outside joints must be figured at double that amount.

Welded Vulcanizers

THE art of welding as it can now be applied advantageously to the construction of unfired pressure vessels is a distinct step of forward progress as against the overlap riveted seam construction of vulcanizing and devulcanizing vessels and autoclaves used in the rubber and other industries.

Rubber plant engineers and executives will receive the greatest benefit of this efficient and economical advancement only by giving attention to the prevention of unnecessarily costly practices in the construction of unfired vessels that the present A.S.M.E. Welding Code condones. F. G. Sherbondy, Biggs Boiler Works Co., Akron, O.

Terkelsen Bead Wrapper

Tire Bead Wrapping Machine

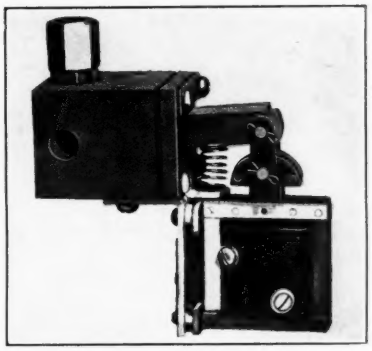
THE bead wrapping machine pictured permits to tire manufacturers very important economic advantages over former bead wrapping facilities. The machine is semi-automatic and so designed that the same operator has sufficient time to operate both bead making and bead wrapping machines. This elimination of labor is possible as it is only necessary for the bead to be placed in the machine and the operator to step on the foot treadle. This action brings the bead into wrapping position, and without further attendance by the operator the bead is wrapped; the machine stops and leaves the bead in the starting position to be removed quickly and easily from the machine.

The actual wrapping time for different size beads will range from 10 to 14 seconds, permitting a production of 3 to 4 beads per minute. If it should only be desired to wrap a portion of a bead, such as the splice, this wrapping may be accomplished equally as well.

The floor area required is about 2 by 3 feet. The machine is operated by a ½ h.p. motor controlled automatically for starting and stopping. Terkelsen Machine Co., 326 A St., Boston, Mass.

Electrically Operated Valves

TWO-, three-, and four-way solenoid operated valves of the type pictured are used in rubber mills to control the flow of air to the air cylinders, which in turn control the operation of certain machines. For example, a two-way air cylinder may be used to operate a tube mold. When the valve is thus applied, it permits air to enter one side of the cylinder to open the mold and then through the two-way feature supplies air to the other side of the cylinder to close the mold. Air cylinders are also used as hoists where a short definite travel is required as, for example, in picking up the top of a mold, raising it about eight inches, swinging it off a conveyer, and setting it down on a table. Here solenoid valves are used to



G-E Solenoid Operated Valve

control the air pressure of the operating cylinders of the hoist. General Electric Co., Schenectady, N. Y.

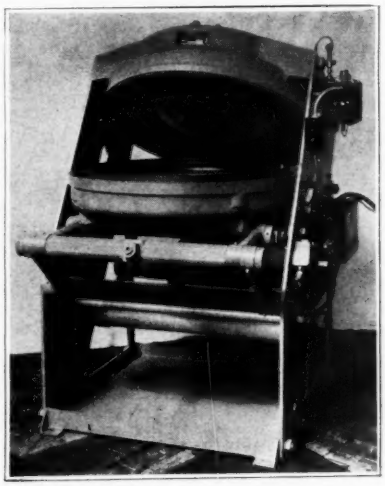
Latex Spray Gun

THE automatic spray gun pictured is of new design, and it embodies the valuable feature of automatically synchronizing the spray material and air both controlled by a single adjustment. Another advantage is that the operator is not obliged to stop the work each time he wants to change widths of spray discharge, for the air is so controlled that any desired changes can be made constantly while the gun is in operation. Thus the coating applied is perfectly smooth and uniform, and it is possible to adjust the delivery from a mere dot to a fan six inches in width.

This gun produces very effective results in the application of latex, also in rubber molding departments for spraying lubricant in molds to facilitate easy removal of the product. Burning Brand Co., 1400-16 W. Fulton St., Chicago, Ill.

Bicycle Tire Vulcanizer

ELIMINATION of the hazards and arduousness of mold handling and at the same time obtaining the advantages of greater facility, uniformity, and economy of vulcanization are the



Ad-Art Photo Studios

Single Tube Vulcanizer

Master Latex Spray Gun

main considerations that have been favorable to the general adoption of individual vulcanizers for automobile tires and tubes. The same considerations are being applied to the curing of single tube bicycle tires.

The accompanying illustration shows a recently developed automatic individual vulcanizer for such tires. It is essentially the same in design and operating principle as the larger tire and tube vulcanizers. The stationary upper and movable lower platens are bowl shaped castings that suitably accommodate the easily interchangeable steam-jacketed molds and also provide dead air insulation.

Activation of the press is accomplished with a motor driven toggle, designed for fast operation and positive locking in the closed position. This equipment incorporates simplicity of mechanical parts, of installation requirements, and of operating details. S. W. Harris, Inc., selling agent, Summit Mold & Machine Co., 1022 S. High St., Akron, O.

Eel-Slip Bearings

A VULCANIZED composition of asbestos, graphite, and rubber has been developed as a bearing material for service under water. It is a tough but readily machined product of low coefficient of friction and is as slippery as its name implies. It fills a long felt need in industry for a bearing material which does not require use of the commonly employed oil lubricants. Water is its best lubricant. When great mechanical strength is needed and the service is severe, this product is most desirable for machinery bearings as on the wet end of a Fourdrinier paper machine.

Eel-slip is readily molded or built up into desired thickness and machined with standard metal working tools. It is unique for many applications requiring mechanical strength, low coefficient of friction, increased efficiency in the presence of moisture, and long wearing quality. Johns-Manville, 22 E. 40th St., New York, N. Y.

New Goods and Specialties

Novel Hot Water Bottle

IN A home which boasts a child a hot water bottle, particularly one designed especially for youngsters, is essential. Illustrated herewith is a seamless bottle that is very practicable despite its unusual shape, that of an elephant from which it gets its name, Jumbo-Jo. This useful product comes in pink or blue and is packed either on cellophaned easels or individual gift boxes. The Seamless Rubber Co., New Haven, Conn.

Jumbo-Jo

Vines Duro-Toe Oxford

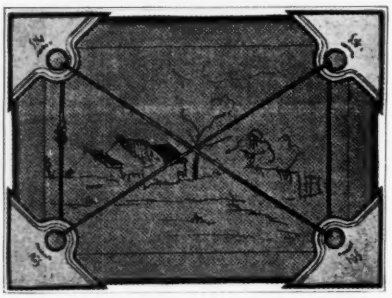
ELLSWORTH VINES, prominent professional tennis player, believing the hard, fast, modern game requires a stronger, faster shoe than formerly available, has designed the Duro-Toe shoe shown here. It has many outstanding features including: patented, scientific, and exclusive "Propr-Bilt" crepe rubber sole, a sole molded all in one piece, embodying all the patented "Propr-Bilt" health features: three-point support for arch, sole, and heel; white duck upper with new designed blucher-bal lacing, which prevents pinching the wearer's instep; special padded tongue increasing comfort; combination last with narrow heel and close-fitting ankle, providing unusual fit and comfort, this last being two widths narrower in the heel than in the ball; Vines Duro-Toe construction: a hard, molded rubber toe-guard, which provides new protection and greatly increased wear; and full cushion sanitary insole that absorbs shock and jar and prevents blistering and bad odor. Wilson-Western Sporting Goods Co., 2037 Powell Ave., Chicago, Ill.

Rubber Frame Protector

RECENTLY patented abroad is a novel product that has promise. It is a frame protector, known as NIS, that is made of spongy rubber of special quality and thickness designed to be a perfect shock absorber. These protectors come in sets of four, one for each corner, with a cord that fits through the brass eyelet in each protector, insuring lateral protection and serving to keep the corners in position when they are used on smaller frames.

This device is tan in color and comes in six sizes to fit various frames. It takes only a few seconds to put on or take off each protector.

They are recommended for packing frames in selling. It is advisable to hang the frames with the protectors on, then to remove the corners at the very last without taking down the picture. NIS can also be used in transporting mirrors, marble plaques, etc. Schollaert Nic, 33 Bierstal, Lovendegem (Ghent), Belgium.



NIS Corners on Frame

New Tennis Shoe

Hand-E-Hang Fastener

Vacuum Cup Automatic Wall Fastener

WHERE and how to hang fountain syringes, hot water bottles, and combinations has always been an aggravating problem to most users of these molded rubber goods. But now no longer is it necessary to search for wall attachments. For Seiberling Latex Products Co., Akron, O., has solved the hanging problem by incorporating a vacuum cup automatic wall fastener on each of these 3 pieces included in the new Seiberling Hand-E-Hang line. It is stated that simply by pushing the vacuum cup fastener against any smooth, flat surface such as tile, glass, or woodwork, the bag will hold with positive security.

All-Rubber Cord

A NEWLY designed type of all-rubber parallel lamp cord has been announced by the General Electric Co.'s merchandise department, Bridgeport, Conn. Designated as type PO-SJ "Special," the new cord is unusual in that both copper conductors are insulated simultaneously with at least a $^1/_{32}$-inch wall of high-grade rubber, which affords good insulation and abrasion characteristics and, in addition, permits easy separation of the individual conductor for assembly purposes.

Fountain Stencil Brush

IF "NEATNESS and Dispatch" is the code of your shipping department, you will welcome the Ideal fountain stencil brush, pictured herewith. Its manufacturer recommends that wherever stenciling must be done, the brush be adopted as necessary equipment, for the Ideal is said to have many advantages. Sturdy and durable, it will stand much service, and it is neat, clean, and efficient. The handle, moreover, holds enough ink to stencil steadily for hours; consequently no smeary inkpot or constant dipping is required. Just a slight twist of the wrist regulates the flow of the ink to your requirements. Much time is saved, and uniform impressions result.

Ideal Brush

The entire device measures 8 inches in length; while the diameter of the brush is 1½ inches. When the brush end wears out, a new one can be obtained, and the change made in a few seconds. Universal Fountain Brush Co., Summit, N. J.

Rubber Industry in America

OHIO

THE first quarter of the year was good for the tire and rubber industry, but now appear definite signs of its tapering off. With the disturbed political situation at home and European conditions it is difficult to guess how business will be during the second quarter of the year. Manufacturers, however, anticipate a hesitancy on the part of buyers to place orders ahead for future delivery while present conditions exist. This may have some effect when the time comes to place orders for fall shipment. Equipment manufacturers state their business with rubber concerns has been very good this year, and the demand for equipment has not yet diminished.

Central Rubber Reclaiming Co., Findlay, according to President S. W. Weiger expects 1935 to be a busy year. He also stated that the plant's manufacture of reclaimed rubber will be broadened to include other rubber products.

F. G. Sherbondy, president, Biggs Boiler Works Co., Akron, is chairman of the code committee of the A. S. M. E.

Ohio Rubber Co., Willoughby, announced the settlement of the recent strike of its employes, with compromises made on both sides.

Master Tire & Rubber Corp., Akron, has announced that G. E. Voll, for the past five years assistant to John F. Schaefer, secretary in charge of sales, The Cooper Corp., Findlay, a Master subsidiary, and for the past few months in charge of the company's wholesale and retail tire distribution in the Youngstown, O., territory, recently was recalled to the company's general headquarters in Akron, in charge of sales promotion for the three tire divisions of Master: Falls, Cooper, and Giant. Master also reported an increase in production at its tire plants of more than 25% over the corresponding period of one year ago, with even a greater increase, approximating 40%, in its Philadelphia plant, The Quaker City Rubber Co., where its rubber mechanical goods such as fire and garden hose, belting, packing, and hundreds of kindred items are manufactured. Installation of new machinery along with other important plant improvements have been going forward for some weeks, substantially enlarging production facilities to take care of a constantly increasing demand for Master products. Master divisions include The Falls Rubber Co., Akron, The Giant Tire & Rubber Co., Findlay, The Cooper Corp., and The Quaker City Rubber Co.

Henry G. Harper

Goodyear Notes

Announcement was made by L. E. Judd, director of advertising and public relations, The Goodyear Tire & Rubber Co., Akron, of the appointment of Henry G. Harper as advertising manager of the company, succeeding C. T. Hutchins, recently resigned. Mr. Harper, who is 39, was born in Charlotte, educated at the University of North Carolina, and joined Goodyear as a counter salesman at Charlotte immediately after graduation in 1917. When the World War broke out, he went to Camp Ogelthorpe where he was commissioned and assigned to Camp Gordon in Georgia. Returning to Goodyear after the war, he became a general line salesman at Charlotte and was made assistant branch manager there in 1928. The following year he went to Richmond, Va., as branch manager and in January, 1933, returned to Charlotte as branch manager.

George J. Welge, Tire Design, will be special representative for Goodyear in the Union of South Africa, where Goodyear does an extensive business in tires, tubes, and mechanical goods. Mr. Welge, who sailed last month for his new post, first will visit England for three weeks.

President Paul W. Litchfield in accordance with his recent promise is sending on a vacation trip to England the Old Guard, that small band of workers who were with the Goodyear company when Mr. Litchfield joined it nearly thirty-five years back and which he organized under the name Old Guard twenty-five years ago. The surviving members of the group, besides their president, include Clara Bingham, Fred Colley, George Swartz, Ed Hippensteal, Al Cunnington, and Ed Viers. They will sail from New York on May 11. Upon landing in Liverpool they will be met by someone from the company's English organization and will visit, among other points of interest, the Wolverhampton plant. They will sail for home from London May 31. The wives also have been invited.

One of the Boardwalk windows of the Du Pont Exhibit at Atlantic City, N. J., recently featured a showing of rubber products by the Goodyear company. Tires for buses, trucks, pleasure cars and motorcycles, also tubes, fan belts, and garden hose were included in the display. The set-up revealed the interior of a high-class dealer's shop with cut-out figure of a uniformed attendant and a customer. An electrically operated display cut-out showed a traffic officer with moving arm, pointing to a legend on the card calling attention to the dangers of skidding. Grasselli chemicals are used in the manufacture of all these rubber goods.

Workers Protest Wagner Bill

On their own initiative workers in the Akron plants of the Goodyear company sent letters protesting against the Wagner Trades Disputes Bill to several large industrial concerns including Standard Oil Co. of New Jersey, Bethlehem Steel Co., Procter & Gamble, International Harvester Co., and Westinghouse Electric & Mfg. Co. The Wagner bill would outlaw all employe associations.

John D. Woolam is sales manager of The National Sherardizing & Machine Co., Akron, division, with office at 1033 S. High St.

The S. W. Harris, Inc., Akron, is an organization formed in February, 1935, to develop and distribute modern vulcanizing and other types of rubber working equipment. The officers, formerly associated with the National Rubber Machinery Co. and Akron Rubber Mold & Machine Co., are S. W. Harris, president; A. S. Michelson, vice president and treasurer; C. F. Safreed, secretary; and T. H. Williams, chief engineer. The new company is the exclusive selling agent for the Summit Mold & Machine Co., 1022 S. High St., Akron. Joseph Chalfant, president, is a specialist in the design and manufacture of automatic individual vulcanizers.

(*Continued on page 68*)

NEW JERSEY

THE majority of rubber manufacturers in New Jersey are satisfied with business conditions at this time and all are optimistic over the spring outlook. Some manufacturers contend that after a long experiment they can see no further benefit from the NRA and believe that conditions would be better without its restrictions. Another thing that seems to be holding business back is heavy taxes.

Nearpara Rubber Co., Trenton, manufacturer of reclaimed rubber, reports increased business for the early spring. The business is now conducted by Benjamin M. and Monty Rosenthal, sons of the late Hyman Rosenthal, founder of the concern.

Murray Rubber Co., Trenton, is experiencing the expected seasonal decline in business. The company, however, had a fairly good fall trade.

Charles E. Stokes, president of the Home Rubber Co., Trenton, and Mrs. Stokes have returned from Phoenix, Ariz., where they spent several weeks.

Puritan Rubber Co., Trenton, finds the demand for rubber tiling continuing good, enabling the factory to employ a full force.

Jos. Stokes Rubber Co., Trenton, announces a decided improvement in business both at the Trenton and Canadian plants. Both factories now are running normally.

Acme Rubber Mfg. Co., Trenton, reports business on the increase, with the outlook much better than that of last spring.

Dr. Frederick J. Maywald, consulting chemist, 305 Hoboken Rd., Carlstadt, is prepared to supply technical information relating to testing rubber materials and the development of rubber and liquid latex compounds.

The Pocono Co., Trenton, is enjoying a very busy season, and some departments are operating overtime. The concern is filling orders for the western trade.

St. Mungo Mfg. Co. of America, golf ball manufacturer, 121-123 Sylvan Ave., Newark, through Vice President W. W. Mills has announced the marketing of a new golf ball, "Perfect Colonel," with a patented Gyro Center working upon the principle of a gyroscope to keep the ball true in flight and insure putting accuracy.

Luzerne Rubber Co., Trenton, reports no change in the hard rubber situation. President Bruce Bedford and his wife have been on a West Indies cruise.

Essex Rubber Co., Trenton, announcing that business is satisfactory, sees a promising outlook for the spring trade.

Pierce-Roberts Rubber Co., Trenton, continues to operate with two shifts in manufacturing druggists' sundries.

Superior Hard Rubber Co., manufacturer of hard rubber specialties, Butler, through Superintendent W. Hopper, announces that its business outlook for the first quarter of 1935 is very favorable, as are future prospects. The firm maintains a sales office at 144 E. 34th St., New York, N. Y.

The Thermoid Co., Trenton, continues busy in all departments. Officials declare the increased output is due to a boom in the automobile industry. The company has been operating with a Sunday force. Edward P. Mitchell, formerly with the L. H. Gilmer Co., Tacony, Philadelphia, Pa., has been made Pacific Coast representative for Thermoid.

NEW ENGLAND

RUBBER companies in New England are quite busy, especially footwear and mechanicals makers and rubber proofers, and they expect to continue so throughout the spring. Manufacturers of machinery for the rubber industry announce that sales for December, January, and February were quite good, but March has shown a decided drop, and the outlook for the spring season is decidedly uncertain.

The B. F. Goodrich Co., Providence, R. I., district agents held a conference at the Providence-Biltmore Hotel on March 12. L. I. Black, of Boston, New England manager, presided, and William A. Donovan, of Boston, New England sales supervisor, addressed the gathering.

The American Wringer Co., Woonsocket, R. I., had a net profit in 1934 of $64,806.99, as compared with $164,608.86 the previous year, according to the annual financial report to the stockholders as of date of February 28, 1935. This report showed that thus far this year the volume is nearly 100% greater than last year, "but until the price structure of our products is better adjusted to increased costs," the directors deferred the consideration of dividends until July 1. The difference in the net profit for last year and for 1933 is explained "very largely by the additional labor cost and shorter working hours under the NRA," the report stated.

Seamless President

F. Thatcher Lane, president of The Seamless Rubber Co., Inc., New Haven, Conn., was born in New Haven, August 23, 1894. He matriculated at Yale University, graduating in 1917. He is also a member of the general code authority of the rubber manufacturing industry, Code No. 156, and chairman of the code authority of its sundries division.

Mr. Lane can be reached at 512 Whitney Ave., New Haven.

Farrel-Birmingham Co., Inc., stockholders held their annual meeting at the company's main office, Ansonia, Conn., February 21, when they reelected the following directors: Charles F. Bliss, Henry F. Wanning, Franklin Farrel, Jr., Nelson W. Pickering, Frederick M. Drew, Jr., Carl Hitchcock, Franklin R. Hoadley, Armin G. Kessler, Walter Perry, Julius G. Day, Fernley H. Banbury, William B. Marvin, Edward H. Green, William A. Gordon, Alton A. Cheney, and George C. Bryant. Then the board met and reelected the following officers: Mr. Farrel, Jr., chairman of the directorate; Mr. Pickering, president; Messrs. Hitchcock, Hoadley, and Kessler, vice presidents; Mr. Drew, treasurer; Laurie K. Blackman, assistant treasurer; Mr. Bryant, secretary; and Mr. Marvin, assistant secretary.

Brockton Tool Co., 103 Belmont St., Brockton, Mass., which for the past twenty years has specialized in molds for rubber heels and soles, has, according to L. Holmes, added a new department for making mechanical, hard rubber, and bakelite molds. In charge of this department is Fred Holzhauer, formerly with the American Hard Rubber Co., Akron, O., and more recently with United States Rubber Products, Inc., Providence, R. I.

United States Rubber Products, Inc., Naugatuck footwear plant, Naugatuck, Conn., at present is operating five days a week in all departments. The spring schedule has not yet been announced.

Hope Rubber Co., Aborn and West Exchange Sts., Providence, R. I., on March 11 suffered considerable damage to its offices and showrooms due to a fire. Clouds of smoke from stocks of rubber goods hampered the firemen. Several hundred pounds of the company's records stored in one of the small rooms were badly burned or water-soaked.

The Fisk Rubber Corp., Chicopee Falls, Mass., at its annual meeting on March 20 elected as a director Harry A. Arthur, president of the American International Corp. of New York. Directors reelected were Karl H. Behr, of Dillon, Read & Co., of New York, N. Y., and Carl P. Dennett, of Boston, Mass.

EASTERN AND SOUTHERN

BUSINESS the first two months of the year was good, but March witnessed a decline. Conditions, however, now seem more promising for the future.

A.S.T.M. Committee on Rubber Products

The American Society for Testing Materials, 260 So. Broad St., Philadelphia, Pa., Committee D-11 on Rubber Products met in Philadelphia March 4 to 8 and received reports from its various subcommittees. The one having jurisdiction over rubber products for absorbing vibration reported on the various methods of hardness testing. This subcommittee also reported the completion of a method for testing compression set of rubber under constant deflection, which is expected to be ready June for publication as tentative. The Subcommittee on Insulating Tape, studying methods of accelerated aging tests for insulating tape, is conducting a cooperative test program for improving and correlating methods for testing friction and rubber insulating tape.

The Subcommittee on Dynamic Fatigue Testing has developed four methods applicable to testing tire carcasses and belts for ply separation and for flex cracking of vulcanized rubber. Before they are presented to the Society further work will be done on them by the subcommittee in charge.

Further work was reported on accelerated aging tests for rubber products, including the Geer oven and oxygen bomb aging tests. It was decided to prepare standard procedures for testing heat deterioration of rubber under elevated air pressures.

Development of reference standard rubber stocks in vulcanized form having certified physical properties which might serve as reference standards in abrasion and other tests was considered, and a definite program decided upon to make such standards commercially available.

A number of revisions in the A.S.T.M. Standard Methods of Physical Testing of Rubber Products (D 15-32) were considered and will be recommended to the Society in June for adoption. Approval was accorded a suggested outline for a Laboratory Test Manual to include existing standard methods for rubber testing and also those now in process of development. It is anticipated that this manual will be available the latter part of this year.

The Subcommittee on Insulated Wire and Cable gave consideration to a number of editorial improvements and changes in substance in existing specifications covering the several types of insulated wire and cable. It is expected that these will be presented to the Society at the annual meeting in June at Detroit, Mich.

United States Rubber Co. recently transferred to its headquarters, 1790 Broadway, New York, N. Y., B. J. Lemon, who had represented the company at Detroit, Mich., as field engineer to contact car manufacturers. He graduated from Cornell University (A.B. 1908; Ph.D. in chemistry, 1913), where he taught analytical chemistry from 1908 to 1915, leaving there to join U. S. Rubber. He has been connected with the general laboratories, sales department, technical service, and field engineering, tire division. Last summer Mr. Lemon had charge of the company's exhibit at the Chicago World's Fair. Cyrus S. Ching, director of industrial and public relations for U. S. Rubber, addressed, as a member of the New York Regional Labor Board, the Industrial Executives' Forum at New Haven, Conn., on March 7.

Vulcanized Rubber Co., Morrisville, Pa., at its annual meeting at its offices, 261 Fifth Ave., New York, N. Y., re-elected the following officers: Stanley H. Renton, president; H. J. Kappler, vice president and works manager; D. D. Smithyman, vice president and general sales manager; John J. Noble, secretary; and Hugh A. Ross, treasurer.

C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y., more conveniently to serve its customers in the South Central States, has opened a new branch factory at 1916 Jackson St., Dallas, Tex., replacing the old Shreveport, La., address which has been closed. The prime function of this new branch factory will be repair work, with special attention to emergency orders. In addition, however, adequate stocks of all TAG standardized instruments will be maintained. A. G. Koenig, southwestern district manager for Tagliabue, will be in charge at Dallas.

A. B. Hohman, 146 Linden Blvd., Brooklyn, N. Y., well-known specialist in thermometry and automatic devices for controlling and recording vulcanization temperatures, represents the Gefft-Jackson valve position indicator, the Imperial liquid gage, and the Summit time and temperature control instruments.

National Association of Purchasing Agents, 11 Park Place, New York, N. Y., will hold its twentieth annual international convention and Inform-a-Show at the Waldorf-Astoria Hotel, New York, May 20 to 23 inclusive. Among those firms exhibiting at the show are listed Eagle Pencil Co., Eberhard Faber Pencil Co., and Jenkins Bros.

McClaren Rubber Co., Charlotte, N. C., according to H. E. Williams, vice president and general sales manager, has moved production up to capacity, employing four shifts of workers, each on a thirty-six-hour week. Plans call for installation of much new equipment this month to permit increased output.

E. I. du Pont de Nemours & Co., Inc., April 1 transferred Russell Morgan from its plant in Fairfield, Conn., to its paint and varnish laboratory at Philadelphia, Pa.

Rubber Code News

Official NRA Orders

Code No. 174: Order 20, denying to Durkee-Atwood Co., Minneapolis, Minn., exemption from the provisions of Article IV, Section 1, of the Code.

Code No. 156: Order 60, canceling Administrative Orders Nos. 156-21 and 174-9, issued July 10, 1934, establishing a rubber industry labor board.

Order 61, granting a stay of the provisions of Chapter X, Article VI-A, Sections 1 and 2, insofar as such provisions prohibit post-dating. This stay to become effective ten days from date of order: namely, January 26, 1935.

Order 63, granting a stay of the provisions of Chapter VII, Article V-A, Section 3, to all members of the mechanical rubber goods division for an indefinite period from the date of this order, so far as the manufacture and sale of metal-lined rubberized gasoline hose is concerned. Order is dated January 31, 1935.

Code No. 156: Order 64, granting a stay of the operation of the provisions of Chapter VI, Article III-A, Sections 4 and 5, of the Code, for an indefinite period until such time as the members of the heel and sole division adjust themselves to a more effective application of the price-filing provisions of this chapter.

Code No. 156: Order 65, granting to the Inland Mfg. Co., Dayton, O., an exemption from the provisions of Chapter I, Articles V-A and V-B, of the Code upon condition that in lieu thereof the applicant comply with the wage and hour provisions of the Code of fair competition for the automotive parts and equipment industry. Exemption is granted from the date of the order: namely, February 7, 1935.

Order 66, denying to the Cumberland Raincoat Co., Jellico, Tenn., exemption from the provisions of Chapter X, Article III-B, Sections 1 and 2, of the Code.

Order 19, denying to the Henderson Tire & Rubber Co., Bucyrus, O., exemption from the provisions of Article VI, Section 15, of the Code.

Code No. 156: Order 68, approving standard specifications and inspection rules in accordance with provisions of Article IV-A, Section 7, Chapter II, of the Code.

Code Authority Members

Rubber Manufacturing Industry. J. D. Lippman, Toledo, O.; N. Boynton, Jr., Boston, Mass.

Rubber Footwear Division. A. B.

Newhall, of the Hood Rubber Co., Inc., Watertown, Mass., as chairman of the divisional code authority. In accordance with provisions of the rubber code Mr. Newhall automatically becomes a member of the rubber manufacturing code authority.

Rainwear Division. Midwest: F. F. Sommers, Jr., Racine, Wis., and A. B. Zuckert, Milwaukee, Wis. New England: William H. Lichtenstein, Boston, Mass., and Fred Monosson, Cambridge, Mass. New York: Moe Sherman and S. D. Harris, both of New York, N. Y. Vulcanizing Division: James J. Drummey, Mishawaka, Ind.

Alternates. Rainwear Division. Midwest: M. Goldberg and Max Kovitz, both of Chicago, Ill. New England: Robert P. Cable and Sam Goldstein, both of Boston, Mass. New York: Charles Plottel and David Asch, both of New York, N. Y. Vulcanizing Division: George E. Goodwin, Milford, Mass.

Reclaimed Rubber. V. H. Gingman, Akron, O.; L. J. Plumb, New York, N. Y.; William Welch, St. Louis, Mo.; and A. I. Brant, Akron, O.; E. B. Curtiss, New York, N. Y.; and Irving Laurie, New Brunswick, N. J., alternates.

The American Toy Fair will be held at the Hotel McAlpin and The Toy Center, both of New York, N. Y., from April 1 to 20. Several rubber manufacturers will exhibit.

The Pennsylvania Rubber Co., Jeannette, Pa., since the recent resignation of President W. O. Rutherford is being managed by the executive board consisting of Vice President A. C. Bowers, Treasurer C. G. Morrill, Comptroller H. C. Walthour, and Sales Manager A. Koehler.

National Industrial Conference Board, 247 Park Ave., New York, N. Y., just completed a revised estimate of unemployment covering the period from April, 1930, to January, 1935. The peak of unemployment during this five-year period occurred in March, 1933, at the time of the banking crisis, with a total of 13,300,000. From that high point, the Board's present estimate shows a decline of 3,158,000, or 23.7%. In April, 1930, when the census of unemployment was taken, the reported unemployed numbered 3,187,647. These unemployed formed 6.5% of the total number of 48,829,000 gainful workers in the United States. Subsequently the Secretary of Commerce put the number of jobless at 6,050,000, based on a sample census in January, 1931.

JAPANESE CRUDE RUBBER NET IMPORTS in 1934 again set a high record: 69,905 long tons as compared with 66,831 in 1933. Japan is now the third largest rubber manufacturer in the world. The United States is first, and the United Kingdom second.

MIDWEST

MIDWEST manufacturers report that their volume of business for the past four months has been better and steadier than that experienced in the past several years. Orders and inquiries continue to come in in a very satisfactory manner, and the outlook for the next quarter, at least, is for a continuance of the present volume. Demands of the automobile industry also are expected to continue large for another three months. Makers of rubber specialties find a considerable improvement in repairs orders though not so much movement as yet toward quantity production for equipment manufacturers. In short, from general indications 1935 should be a better year for the industry than was 1934.

Company group candidates dominated in the primaries recently conducted by the Automobile Labor Board for the purpose of selecting plant bargaining committees. The summary of affiliations shown by 84,648 employes follows: unaffiliated, 64,042; employe associations, 9,025; associated auto workers, 4,102; American Federation of Labor, 3,410; minor organizations, 834; not voting, 1,407; void, 1,828.

National Association Waste Material Dealers

The Twenty-second Annual Convention of the National Association of Waste Material Dealers, Inc., was held at the Hotel Sherman, Chicago, Ill., March 20. The following officers and executive committee were elected: Nat E. Berzen, president; Julius Muehlstein, vice president; Charles M. Haskins, secretary-treasurer.

Executive committee: M. F. Berg, H. H. Cummings, David Feinburg, Samuel Greenfield, A. Lowenstein, E. B. Friedlander, and Alex Schulman.

On the same day the Scrap Rubber Institute elected the following to serve on the code authority for the scrap rubber trade: E. B. Friedlander, Julius Muehlstein, A. Schulman, and Samuel Greenfield.

Aaron Pollack was appointed to serve as a mixed dealer on the code authority for the scrap rubber trade. It was also voted to send a letter to the trade pointing out the need of proper packing to avoid unnecessary rejections. Regarding breaches of contract, the Secretary of the National Association of Waste Material Dealers, Inc., will continue to handle and adjust complaints of this nature; and where no adjustment can be made, he will notify the trade accordingly.

Following a discussion of the restrictions against tires by the rubber reclaimers, it was moved to arrange a meeting between a committee of the Scrap Rubber Institute and a committee of the rubber reclaimers to discuss this matter.

Golf Ball, Inc., Lowe Ave. at 58th St., Chicago, Ill., manufacturer of The Famous Scot Family and Super Streak golf balls, recently moved to a new plant to take care of additional demand. Erwin Huebsch is president of the company.

Sears, Roebuck & Co., Chicago, Ill., last month held a periodical merchandise sale of limited duration, about a week and a half, during which prices of first-line tires were cut about 10%. After the sale, however, prices were restored to their former level.

The Williams-Bowman Rubber Co., with office and factory at 1941-51 So. 54th Ave., Cicero, Ill., manufactures molded and extruded rubber goods, plumbers' supplies, gaskets and washers, and rubber covered rolls. W. J. Williams is president of the company.

Binney & Smith Co., 41 E. 42nd St., New York, N. Y., specialist in carbon blacks, bone blacks, and oxides of iron, has appointed the O'Brien-Worum Co., St. Paul, Minn., as sales representative in St. Paul and surrounding territory. The firm also will handle Binney & Smith Co.'s coblac, stearic acid, and colloidal dispersions.

PACIFIC COAST

REPORTS from the Coast are not very encouraging. Progress has been made to stabilize the prices of mechanical items, but on accessories for the automotive industry, such as floor mats, radiator hose, fan belts, etc., business is in a chaotic condition; yet nothing constructive has been done about it.

Mission Tire & Rubber Co. plant, 2417 Harrison St., San Francisco, Calif., was swept by fire March 12. Albert Jarkieh is owner of the concern.

Griffith Rubber Mills, manufacturer of rubber covered rolls and mechanical rubber goods, 22nd and Nicolai Sts., Portland, Ore., according to General Manager Z. A. Wise, has experienced exceptionally good business since last fall; while prospects appear excellent for the coming spring and summer months. The firm installed a complete retreading department in its plant and six months after installation was required to double the machinery. Now the department is working full twenty-four hours. Besides Griffith has made extensive improvements in its general plant. Alan C. Dunham is general sales manager.

THE INTERNATIONAL LABOR OFFICE, Geneva, Switzerland, soon will hold an examination to fill a technical position in that office. Persons in the U. S. having a special knowledge of industrial safety may apply.

OBITUARY

Goodrich Executive

AFTER many months of ill health William W. Martin, assistant comptroller of The B. F. Goodrich Co., Akron, O., died in Tucson, Ariz., March 3. He had been with the company since 1913, serving mainly as an accountant and traveling auditor. In 1927, however, he was appointed head of the Société Française B. F. Goodrich, Colombes, France. Then in 1933 he returned to Akron as assistant comptroller of the company.

Mr. Martin was born in Toledo, O., forty-five years ago. He was graduated from a Cleveland business college.

Surviving are his wife and a son.

Veteran Rubber Man

ON MARCH 7 died James Henry Learned, long associated with the United States Rubber Co. In 1889 he joined the Revere Rubber Co., Boston, Mass., later absorbed by U. S. Rubber, as city salesman and later served as order clerk and manager of various departments. Prior business connections include a year in the office of a New England judge, four years in the sales department of the Revere Sugar Refinery, and a year as bookkeeper with Faunce & Spinney, shoe manufacturer.

Mr. Learned, who was born in Chelsea, Mass., April 9, 1868, attended the local grade schools, graduating at the age of fifteen.

He had been a member of the Art, Boston City, Algonquin, Country, and University clubs, the Rubber Association of America, and the Masons.

Surviving are his wife, a daughter, a sister, and two brothers.

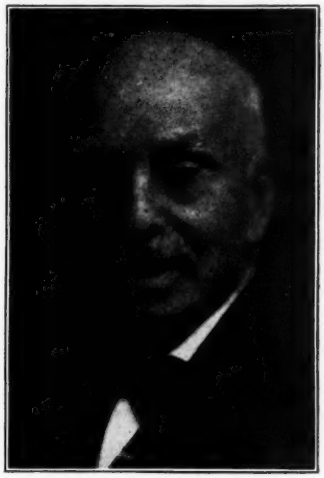
Funeral services were held March 9 at his home in Brookline, Mass.

General Superintendent

JAMES F. LEAHY, general superintendent of the Buffalo, N. Y., plant of the Farrel-Birmingham Co., Inc., Ansonia, Conn., died at his home in Kenmore, N. Y., March 6, after a month's illness. He was born in Torrington, Conn., October 23, 1870, and resided in Ansonia for 22 years, where he had been employed by the Farrel company since December 2, 1901. Mr. Leahy was machine shop foreman at the Ansonia plant before being transferred to the superintendency at Buffalo twelve years ago. In 1922 he and the late David R. Bowen accompanied Franklin Farrel, Jr., to England to investigate the gear cutting process invented by W. E. Sykes. Upon their recommendations the Farrel company purchased the American rights to the patent and acquired the plant at Buffalo where the Sykes gear machines, gears, and related products are manufactured.

Mr. Leahy is survived by his wife.

Funeral services were held from St. John the Baptist R. C. Church, Tonawanda, N. Y., March 9.



William P. Earle

Veteran Rubber Man

WILLIAM P. EARLE, retired rubber broker, who died at his home in Brooklyn, N. Y., with pneumonia on March 15 in his ninetieth year, was born in Providence, R. I. He came to New York in 1877 and became a bookkeeper for Smythe, Earle & Co., formed in 1871 and consisting of Henry Smythe and Joseph P. Earle. This firm was the recipient of a medal awarded by the U. S. Centennial Commission for being a pioneer in the rubber business.

In 1877 the firm of Earle Brothers consisting of Joseph, Henry, and William P. Earle, was organized at 66 Broad St., New York, N. Y., as brokers of crude rubber. In the 80's the Emperor of Brazil presented Earle Brothers with a knapsack biscuit of Para rubber in recognition of their prominence as crude rubber brokers.

After the deaths of Joseph P. and Henry Earle the firm consisted of William P. Earle and Harry W. Laird. Mr. Earle's sons, William P., Jr., and Russell W. Earle, were admitted as partners between 1905 and 1912, and continued as such until the liquidation of the firm in 1929. Mr. Earle, Sr., retired in 1920. The business under the same style name is now carried on by Wm. P. Earle, Jr., doing business in balata, gums, chicle, etc.

The deceased leaves also two daughters.

Funeral services were held at his home March 17. Burial was in the family plot at Swan Point, Providence, R. I.

Sales Manager

FRANK V. JEMISON, for seventeen years sales manager of the Murray Rubber Co., Trenton, N. J., died February 6 at his home in Hamilton Square, N. J. Death was due to a heart attack.

Mr. Jemison was born at Kingston, N. J., sixty-four years ago. Following his graduation from Peddie Institute, Hightstown, N. J., he became cashier of the institute and held the position for several years. He was also treasurer of the Trenton Baptist Association. He was a Mason.

He is survived by his widow, a son, and a daughter.

Burial was in Hightstown Cemetery.

Employment Manager

JAMES H. NETTLETON, employment manager of the Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., died February 23 following an operation. Mr. Nettleton, who was a veteran in the industry, was also treasurer of the Ball-Brand Foreman's Club, a Mishawaka Rubber organization.

Rubber in Linoleum

(*Continued from page* 51)

to produce various types of the product.

The last stage of the investigation is concerned with the translation of the experimental work to a small-works scale, and while it is not possible to indicate costs of production sufficiently accurately to institute comparisons with those of other floorings, it is suggested that linoleum manufacturers may be interested in the following formula.

	Parts by Weight
Rubber	100
Sulphur	2.5
Zinc oxide	20
Whiting	120
Wood flour	100
Palm oil	5
Rosin oil	5
Vulcatac S.	20
Paraffin wax	15
Vulcafor Z.I.X.	0.6
Vulcafor D.D.C.N.	0.3
Nonox	0.25
Color	4—30

Canada

CANADIAN rubber manufacturers report trade so far in 1935 seems about equal to that during the same period last year. The season for rubber footwear is practically over, and it is difficult to foretell the possible volume for 1935 until summer or early fall, when advance orders begin coming in. The volume in rubber-soled canvas footwear this spring and summer will be somewhat less than last season's because of the large amount of imported goods entering the Dominion. Since, however, a higher protective tariff recently was levied against imports from non-Empire countries, manufacturers expect that as soon as these imported products have worked their way out with seasonable weather this summer, the home industry again will enjoy its usual demand.

FINANCIAL

Fisk Rubber Corp.

For the year ended December 31, 1934, the Fisk Rubber Corp., Chicopee Falls, Mass., reported a net profit of $728,696.96 after making provision for depreciation and federal income taxes. After deducting preferred dividends of $6.00 per share, earnings on the common stock amounted to $1.16 per share. The percentage of net profit to net sales in 1934 was 7.1 based upon sales of $10,228,760.76 representing an increase of $1,049,288.17 over 1933.

Monsanto Chemical Co.

Consolidated sales of the Monsanto Chemical Co., St. Louis, Mo., and its subsidiaries for 1934 were 14% greater than for 1933 and the largest in the company's history. Earnings for 1934 were $2,771,629.29 or $3.20½ a share on the 864,000 shares outstanding. These earnings include Monsanto's proportion of the undivided profits of controlled companies not consolidated and uncontrolled companies. Earnings for 1933 after giving effect to the 100% stock distribution of last April amounted to $2.57 a share, a record surpassed only by 1934.

Net current assets were $7,540,832, an increase of $2,224,291 over last year, and total assets at an all time peak of $26,904,720. Expenditures for research in 1934 totaled $456,356, an increase of 11% over 1933. A much larger amount has been budgeted for 1935.

O'Sullivan Rubber Co.

O'Sullivan Rubber Company, Inc., Winchester, Va., for 1934 reported a net profit after federal taxes and other charges, of $26,877, compared with $96,997 profit in previous fiscal year ended September 30, 1933. Net sales were $1,313,120, against $1,156,634.

Pittsburgh Plate Glass

The financial statement of the Pittsburgh Plate Glass Co., Pittsburgh, Pa., shows that gross earnings for 1934, after deduction of depreciation, depletion, and losses and expenses in connection with property removals, were $7,485,147, compared with $4,981,163 in 1933. Net income was $5,763,684, compared with $3,993,934 in 1933. Cash dividends declared in 1934 amounted to $3,104,614. This compares with $1,498,563 cash dividends declared in 1933. Cash dividends paid to stockholders in 1934 were at the aggregate rate of $1.30 a share. All taxes for 1934 were $1,758,232, and all employes' benefits, including the special pension and relief provisions, $1,085,117.18; a total for both of $2,843,349.18, or 49.3% of the total net earnings. After all deductions, including dividends, there was carried to surplus $2,827,586 at December 31, 1934.

U. S. Rubber Co.

Net sales of the United States Rubber Co., 1790 Broadway, New York, N. Y., after the deduction of all returns, discounts, sales and excise taxes, transportation and other allowances, amounted to $105,476,872, an increase of $17,150,206, or 19% over 1933. The consolidated statement of operations does not include sales of tires or other products by controlled companies whose capital stock is not wholly owned by the company.

The profit from operations for the year, before deduction of interest on funded indebtedness and provision for depreciation, was $10,485,914. After deduction of interest amounting to $3,631,869 and depreciation of $5,966,400, the net profit of 1934 was $887,645. A reserve for federal and foreign income taxes of $292,310 was provided. Further charges less credits, not applicable to the current year's operations and including a provision for contingencies of $800,000, caused a charge to surplus of $543,608 for the year. The net increase in surplus of the plantations companies was $1,735,842, and the decrease in net worth of securities of controlled companies was $189,148 so that the net increase in the equities held by the stockholders of the United States Rubber Co. was $1,003,086 for the year.

On December 31, 1934, total current assets were $57,743,651, including cash in the sum of $10,979,722. Total current and accrued liabilities were $14,178,463, including $1,485,000 of 6½% serial gold notes maturing March 1, 1935. Net quick assets were $43,565,188 on December 31, 1934, and were $39,320,854 on December 31, 1933, an increase of $4,244,334 for the year. The ratio of current assets to current liabilities was 4 to 1 at the close of the year.

The net book value of all properties, plants, and equipment was $73,746,840 on December 31, 1934, a reduction of $3,839,732 for the year. Properties available for sale, which are not required for manufacturing purposes and upon which no depreciation was accrued for the year had a net book value of $18,416,774.

The net worth of the common stock, consisting of 1,464,371 shares of no par value, was $11,465,185 or $7.83 a share, after deducting the value of goodwill, patents, etc., carried on the books of the company.

United States Rubber Plantations, Inc., had a profit of $3,378,682 before provision for depreciation and amortization of $1,642,840, which resulted in a credit to surplus of $1,735,842 for the year. Amortization, based on the estimated useful life of the trees, was resumed, and provision of $1,183,093 was made for this purpose.

Production for the year was 50,986,000 pounds compared with 48,718,000 pounds in 1933. In order to export this production rights to export under the restriction plan were purchased to the extent of 2,190,000 pounds. Approximately 99,000 acres were planted, and 88,000 acres have reached maturity. 79,250 acres were in bearing, with an average yield per acre of 643 pounds.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Pfd.	$2.00 q.	Apr. 1	Mar. 16
Dominion Rubber Co., Ltd.	Pfd.	$1.75 q.	Mar. 30	Mar. 23
Fisk Rubber Corp.	Pfd.	$1.50 q.	Apr. 1	Mar. 12
Garlock Packing Co.	Com.	$0.25	Apr. 1	Mar. 23
General Tire & Rubber Co.	Pfd.	$1.50 q.	Mar. 31	Mar. 20
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$1.25 q.	Apr. 1	Mar. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd.	$1.75 q.	Apr. 1	Mar. 15
Hope Webbing Co.	Com.	$1.50 q.	Feb. 1	Jan. 25
O'Sullivan Rubber Co.	Com.	$0.10 q.	Apr. 1	Mar. 18
Plymouth Rubber Co., Inc.	Pfd.	$1.75 q.	Apr. 15	Apr. 10

New Incorporations

E & M Tire Sales, Inc., of Pawtucket, R. I. Capital stock of 100 shares common, no par value. E. L. Shine, K. L. Shanahan, and J. C. Going.

H.-G. Rubber Corp., 147th St. and Marshfield Ave., Harvey, Ill. Capital 70 shares common, no par value. E. W. Heeter, F. T. Moloney, and F. R. Schwanke. Manufacture rubber goods of all kinds.

Quennard Latex Products Corp., 115 Frelinghuysen Ave., Newark, N. J. Capital $50,000 preferred and 10,000 shares, no par value. G. H. Quennard, Morristown, N. J., G. Rosendale and S. C. Whitbeck, both of 123 William St., New York, N. Y. Manufacture rubber boots, shoes, raincoats, and other products.

Rocket Products Corp., 15 Exchange Pl., Jersey City, N. J. Capital 100 shares, no par value. F. J. White, R. F. Lewis, and W. L. Hanle, all of 15 Exchange Pl. Manufacture rubber stamps and other goods.

Superior Rubber Mfg. Co., Inc., (N. Y.). Capital $10,000. J. P. Sullivan, 164 E. 38th St., New York, F. R. Morse, 4332 41st St., Sunnyside, L. I., and M. C. Kuehler, 2419 24th St., Astoria, L. I., all in N. Y. Rubber goods.

Winston-Salem Rubber Co., Winston-Salem, N. C. Capital stock, $100,000; subscribed stock, $400. Mr. and Mrs. C. J. Livergood, Winston-Salem, and P. O. Poole, Durham. To manufacture rubber tires and any and all other rubber goods.

Rubber Industry in Europe

GREAT BRITAIN

Rubber at the Fair

The British Industries Fair held in London, February 18 to March 1 emphasized the remarkably diverse ways in which rubber serves the sporting world. The displays of balls alone were a revelation: golf balls, tennis balls, beach balls, toy balls; inflated, sponge filled, colored and plain, smooth surfaced, creped to give a better grip, tiny balls not much bigger than a large marble, and enormous beach balls. Among the novelties was Dunlop's new tennis ball with Duronap cover consisting of a rough body fabric with deep, close tough nap. It is claimed that this cover doubles the life of the balls, for even after the nap is worn, the rough body fabric continues to make 100% control possible.

A wide range of Dunlopillo products was also on view: cushions and mattresses for home and hospital, seating of all kinds, and a new type of lounge chair said to combine the utmost in comfort with low price. Dunlop also showed an attractive variety of latex-proofed raincoats, some with the new Aertex ventilating linings across back and shoulders. Aertex fabric is loosely woven, light, porous, and capable of absorbing large quantities of body moisture which is thus prevented from condensing on the inside of the waterproof and making it damp.

The readiness with which British cloth manufacturers have adopted latex thread was fully demonstrated at the stand of the Lastex Yarn & Lactron Thread Co. Latex thread is featured not only in women's wear: corsets, lingerie, bathing suits, hosiery, millinery, etc., but also in knitted ties, pants with the latex thread at the waist, and in men's caps.

The Reliance Rubber Co., Ltd., again showed something new in hot water bottles. This time the chief attraction was the "Jubilee" in a fine shade of blue, Jubilee blue, with a silver rubber medallion portrait of the King and Queen of England. A collapsible whirling spray, the pipe of which can be detached and slid down through the opening into the bulb for convenient packing, was also shown.

Rubber flooring in rolls six feet wide was displayed by the Runneymede Rubber Co., Ltd. This flooring has a very glossy surface which, it is claimed, will not wear off in use.

Among the large variety of sporting goods made by David Moseley & Sons, Ltd., was the Moseley Poolraft, an eight-foot raft bearing the weight of twenty persons. It can be inflated to any pressure desired and is claimed to be unsinkable.

Very attractive beach shoes in a variety of artistic designs and colors were shown by Phillips Patents, Ltd. These shoes, marketed under the name "Silver Wing," are made of latex by a special, recently acquired process and they are said to be of exceptional quality.

Zipper fastenings do not properly come under the head of rubber goods. Nevertheless mention must be made of the new zippers of a plastic material instead of metal and obtainable in thirteen different shades including some transparent and others translucent. The zippers are mounted on high grade rayon tape put out in nine matching shades. These were to be seen at the exhibition stand of Lightning Fasteners, Ltd.

Rubber in the Gas Industry

The uses of rubber in the gas industry were discussed by C. R. Austen, of the Gas, Light & Coke Co., at a meeting of the London and District Section of the Institution of the Rubber Industry. To begin with the manufacture of gas, rubber has been found eminently suitable for conveyer belts for handling coal, coke, and clinker. Belts up to 54 inches wide, capable of carrying 2,000 tons an hour, have carried 11,000,000 tons of coal without showing appreciable signs of wear. Belts for carrying coke show less resistance because of the high abrasion properties of coke, but a good belt will carry over 300,000 tons before wearing out. For conveying hot coke, when the temperature may exceed 250° F., the belt has a lining of asbestos under the top layer of rubber.

In addition, rubber is used for liners for saturators in ammonium sulphate plants, for chutes in coke plants, for hose pipes for steam, air, and water; for covering the wires of coke screens, by anodic deposition, for hydraulic valves, joints, diaphragms, etc.

Research Associations

Various investigations were conducted by the Research Association of British Rubber Manufacturers during 1933. This association jointly with the British Electrical & Allied Industries Research Association has progressed in investigating ebonite. It has been found that important differences in certain properties result according to the curing method used, and useful information has been gained in connection with the production of oil-resistant ebonite. The two organizations are also working together on methods of testing strength and tensile of ebonite and other molded dielectrics.

Preliminary tests with powdered rubber already suggest new and more economical methods of manufacture, and the development of new uses of rubber and experiments on a larger scale are planned.

Interesting results have been obtained in investigations on the effect of organic liquids, petrol, mineral oils, etc., on rubber. Work is progressing to develop a simple method of measuring the coefficient of expansion of vulcanized rubber, important for producing accurately dimensioned molded goods, and to investigate the dependence of this property on the composition and degree of cure of the rubber.

A Development and Advisory Section, separate from the Research Section, has been established to deal solely with matters of direct practical importance to manufacturers, thus leaving the Research Section freer to devote itself to investigations of a fundamental nature.

British Notes

Since January, 1934, a new monthly publication, "Rubber Patent and Trade Mark Review," has been issued, which gives a complete index of patents, designs, and trade marks for the principal rubber producing and manufacturing countries and includes special articles on patents and trade mark problems, besides a review of current articles on these subjects of rubber interest.

The L. M. S. Railway is again testing rubber-tired rail cars, this time with a 56-seater rail-car running on 16 rubber-tired wheels and capable of a maximum speed of approximately 70 miles per hour.

Czechoslovakia

Despite setbacks, Czechoslovakia continues to grow in importance as an importer of crude rubber and an exporter of manufactured goods. In 1934 crude rubber imports increased from 112,190 to 117,740 quintals; the value of imports of rubber manufactures declined from 37,970,000 to 25,790,000 kronen, and the value of exports of rubber goods rose from 63,260,000 to 64,410,000 kronen.

The reduction in value of imports and the rise in that of exports are both almost entirely due to the recent develop-

ment of the tire industry in the country which, on the one hand, led to a substantial decrease in imports of all kinds of tires and on the other, to increased exports of these goods. Imports of cycle tires and tubes in 1933 amounted to 160,925 units, value 1,422,000 kronen; in 1934 they were 103,912 units, value 1,046,000 kronen; while imports of other tires and tubes, which had been 118,644 units, value 19,494,000 kronen, in 1933, were only 30,408 units, value 6,473,000 kronen, in 1934. By contrast exports of cycle tires and tubes totaled 24,697 units, value 144,000 kronen, against 11,075 units, value 69,000 kronen, and of other tires and tubes, 21.572 units, value 2,816,000 kronen, against 3,047 units, value 296,000 kronen.

Notable changes also occurred in the footwear industry. Imports of footwear of rubber combined with other materials fell from 19,770 pairs, value 625,000 kronen, to 13,362 pairs, value 487,000 kronen; while exports soared from 430,345 pairs, value 4,971,000 kronen, to 973,599 pairs, value 8,976,000 kronen. The very opposite took place in the case of other rubber footwear; here the imports jumped from 15,632 pairs, value 215,000 kronen, to 26,840 pairs, value 261,000 kronen; and the exports fell from 5,014,944 pairs, value 29,293,000 kronen, to 4,411,768 pairs, value 27,194,000 kronen.

Similar changes are also noted with regard to thread, imports 870 quintals, value 4,098,000 kronen, against 660 quintals, value 3,427,000 kronen; exports 1,530 quintals, value 6,862,000 kronen, against 2,100 quintals, value 8,870,000 kronen; belting, imports 310 quintals, value 1,254,000 kronen, against 230 quintals, value 1,057,000 kronen; exports 70 quintals, value 208,000 kronen, against 100 quintals, value 260,000 kronen; elastic fabrics other than silk, imports 60 quintals, value 838,000 kronen, against 40 quintals, value 447,000 kronen; exports 510 quintals, value 3,691,000 kronen, against 700 quintals, value 4,607,000 kronen. Some expansion occurred in the local rubber toy industry, as imports declined from 140 quintals, value 622,000 kronen, to 90 quintals, value 585,000 kronen; while exports rose from 70 quintals, value 214,000 kronen, to 280 quintals, value 620,000 kronen.

Both the imports and the exports of other soft rubber goods declined 350 against 390 quintals and 3,310 against 4,480 quintals, respectively.

According to the *Revue Générale du Caoutchouc*, Czechoslovakia for several years has been experimenting with various plants to develop a source of homegrown rubber. The plants investigated include *Asclepias Syriaca, Rhus Cotinus, Euconnia Ulmoides, Maclura Aurantica.* So far the first-named plant seems to be the most promising; so chemists are studying methods of extracting the rubber from the latex which is yielded by the plant.

GERMANY

Tires for:		Production Number	Sales: Inland Number	Sales: Foreign Number
Passenger cars	Covers	1,302,482	1,281,792	75,430
	Tubes	1,224,524	1,221,507	63,878
Delivery trucks	Covers	151,470	142,446	18,604
	Tubes	123,367	119,291	10,178
Trucks and buses				
Giant pneumatics	Covers	155,869	144,940	21,661
	Tubes	154,265	142,043	15,593
Solid tires		58,918	54,470	1,749
Carts and tractors				
Pneumatic tires	Covers	3,835	4,713	179
	Tubes	3,667	3,665	164
Solid tires		22,904	28,307	961
Motor cycles	Covers	568,522	548,206	16,336
	Tubes	501,874	519,739	18,592
Bicycles	Covers	21,168,568	21,513,615	435,856
	Tubes	16,362,433	16,857,842	500,632
	Tube tires	97,553	103,760	3,006

Statistics

Crude rubber imports into Germany during 1934 reached the record figure of 636,612 quintals, against 582,170 quintals the year before. Reexports were 33,792 against 32,281 quintals so that the net quantity of rubber retained was 602,820, against 549,889 quintals.

During the first half of 1934 crude rubber imports had averaged about 65,000 tons a month; after the government began to issue orders controlling imports, a sharp decline in crude rubber arrivals set in. However in December, 1934, imports totaled 54,653 quintals, only 12 quintals less than for December, 1933.

It is also worth noting that whereas exports of rubber manufactures decreased from 142,542 quintals, value 47,478,000 marks, to 133,645 quintals, value 41,767,000 marks, in 1934, imports of rubber goods practically doubled as to quantity, and the value also rose. The figures were 33,262 quintals, value 5,764,000 marks in 1934, against 18,555 quintals, value 5,526,000 marks, in 1933.

The government measures to stimulate the motorization of Germany appear to be having the desired effect. At all events data published by the *Gummi-Zeitung* show a remarkable increase both in the production of motor vehicles and in the registration of new automobiles during 1934. Production of passenger cars increased 60% as against 1933 and 300% as compared with 1932; even the former record output of 1928 was exceeded by 38%. The output of trucks and delivery cars in 1934 was double that of 1933 and three times that of 1932, and a similar gain was recorded for motorcycles. This considerable spurt forward now brings Germany nearer the ranks of England and France in this respect; new registrations in 1934 were not much less than those for France.

This expansion in the automobile industry is, of course, influencing the tire industry here. Unfortunately production figures for 1934 are not yet available. But there seems to be ample ground for believing that the improvement in the tire industry, noted in 1933 for the first time after the steady decline during the period of 1929-1932, continued, probably in much more marked degree, through 1934.

The 1933 production and sales figures are shown in the table above.

German Notes

A government order of January 23, 1935, prohibits the use of mixings containing more than 49% by volume of rubber in making coverings for conductors and cables. Certain specified conductors are exempt from this ruling as are all goods intended for export.

The sales organization acting in Germany for manufacturers belonging to the Cologne Rubber Thread Cartel reports further progress during 1934. Sales on the home market have increased again, and returns are now normal, thanks to price-fixing. But the foreign business, regulated by the International Rubber Thread Association in Zurich, Switzerland, continues unsatisfactory owing to Japanese competition which forced a reduction in prices despite the rise in crude rubber.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
*8,479	Belt conveyers	Brussels, Belgium
*8,486	Automobile and truck tires	Casablanca, Morocco
*8,492	Carbon black	Milan, Italy
*8,500	Mechanical goods	Manila, P. I.
*8,517	Surgical goods	Copenhagen, Denmark
*8,518	Thread for elastic fabrics	St. Etienne, France
*8,519	Druggists' sundries	Lima, Peru
*8,524	Tires and inner tubes	Kaunas, Lithuania
*8,526	Rubber cartridge container parts	Toronto, Canada
*8,535	Carnival balloons	Lima, Peru
*8,546	Tires and inner tubes	Zanzibar, East Africa
†8,566	Seamless balls	Mexico, D. F., Mexico

*Agency. †Purchase.

Rubber Industry in Far East

NETHERLAND INDIA

Restriction Notes

The discussions on rubber restriction at the extraordinary meeting of the Council of Netherland India held in Batavia on January 21 brought out that contrary to the expectations of the pessimists, the special export duty on native rubber caused very little difficulty. The great majority of small holders, who for the most part do their own tapping, were on the whole quite satisfied with the price obtained and with the liberty left them to tap at will. On the other hand the restrictive effect of the measure has been satisfactory, and the general conclusion was that for the present the export duty should continue to be levied in the important native rubber centers.

Native owners of larger gardens, who have to hire help for tapping, have not fared so well and seem to have borne the brunt of restriction so far. Immigration of coolies has practically ceased, and these owners have great difficulty in obtaining tappers. It has therefore been suggested that part of the proceeds from the special export duty be used to pay such owners a premium for not tapping, which suggestion to many appears a happy solution of the problem and will receive careful consideration. Others wish to go still further and offer a premium for chopping down trees, a step that may well be taken eventually.

To secure still better control of native rubber and reduce speculation to a minimum, it has been proposed to fix the special export duty weekly instead of monthly.

The census of rubber trees in the districts where individual restriction is to be introduced has practically been completed, and partial results are now available. The figures follow:

District	No. of Producers	Tappable Trees: Tapped	Tappable Trees: Untapped	Total Number of Trees
Banka and Dependencies	18,541	6,626,236	about 600,000	.....
Tapanoeli (not including Batak lands and Nias)	55,000	10,264,762	6,480,659	32,886,602
West Coast Sumatra	.....	6,715,906	4,569,205	9,680,279*
Tandjong Pinang Division / Riouw and Dependencies	8,956	4,151,102	3,598,910	13,022,908

*Solok not included.

The figures for total number of trees include young trees that have not yet reached the tapping stage. The above data, although incomplete and covering only a small section of the native rubber industry, are interesting as they show what a considerable proportion of mature trees has not yet been tapped and, to a lesser extent, the large number of young trees that in the near future will come to maturity. It is thus quite evident that in the districts considered, at least, there are more than ample reserves of rubber trees to make up for any damage that might be caused by overtapping. It is also apparent that without restriction and given the right price and ample labor producers could increase their present outputs by around 60%. Incidentally we gain an idea of the formidable task the enforcing of individual restriction among so many small-holders will be.

The census of trees and registration of gardens in all other rubber districts are to be started immediately.

A question receiving much attention is the use to be made of the funds yielded by the special export duty. This money, it was promised, was to be used to benefit native rubber growers, and so far they have been assisted in most districts by the reduction in their taxes. A large and growing balance still remains, and it is proposed to set aside certain sums and use the interest for definite helpful purposes as irrigation works to increase the production of food crops, stimulation of the production of other crops and of village industries, for education, and for philanthropic purposes.

Hitherto most of the native rubber has been put out in the form of wet biscuits; Banka, Riouw, and a section of the Western Division of Borneo supplied so-called native sheets, prepared by mangling and more or less complete drying, which for the most part had to be reworked before they could be exported to the consuming countries; finally there was and is the sheety crepe produced in Tapanoeli which requires no further finishing. The special export duty led to the more widespread preparation of dry rubber, and at present 45% of the exports are in the form of dry sheet or blanket. However certain undesirable practices have crept in, particularly in the so-called "wet" districts, where the wet biscuits have simply been rolled out to thin slabs and sheets to express the water, but have not been dried, thus yielding a product of still lower quality than the customary wet biscuits.

To remove this evil, to enable the native producer to obtain a fair price for his product, and at the same time to give the local exporters the opportunity to compete with the Singapore market, on which practically the entire output of Dutch native rubber is now dependent, are three problems which local authorities are trying to solve by special propaganda for improving native rubber. Special officers have been detailed to give the necessary advice and information to growers in the chief wet rubber centers: Southern and Eastern Borneo, Palembang, and Djámbi, notorious for the poor quality of the rubber; in addition hand mangles and small smoke houses have been made available on easy terms of payment.

Native Planters' Association

The Sarekat Penaman Boemipoetra, a native planters' association, has just been formed at Batavia to take care of the interests of native growers of commercial products. The society will maintain an office to study the commercial, economic, technical, and juridical situation of the native planting industries, including, of course, rubber, will promote and handle sales of the products of members, seek new local and foreign business connections, and set up standards to raise the quality of the products of members and thus facilitate marketing. The improvement of the condition of the native rubber industry naturally will be an important object.

Budded Areas

Statistics recently published by various authorities permit a survey of the world's acreage under budded rubber. Official data reveal the budded area in Java is now 35,825 hectares or about 89,000 acres; in Sumatra, 104,266 hectares, about 260,000 acres; other outer possessions, 2,586 hectares, 6,400 acres, bringing the total for Netherland India to 142,677 hectares, approximately 355,400 acres. The Malayan statistics compiled by D. H. Grist[1] place the total budded area for that country at 164,559 acres. The well-known expert on budding, P. J. S. Cramer, estimates the budded area of Indo-China at 90,000 acres; about the same figure as officially issued in 1932; Dr. Cramer also adds roughly 5,000 acres for various other countries. Adding the figures

[1] India Rubber World, Jan. 1, 1935, p. 64.

from these different sources we come to a total for all rubber producing countries of 614,959 acres, which is still a very small amount as compared with the total area of plantation rubber, now estimated to be over 8,000,000 acres.

Replanting

Since the present restriction scheme prohibits all new planting, but permits a certain amount of supplying and replanting on areas already under rubber, many estates having old, less productive sections will probably consider replanting as soon as funds are available. Recent company reports indicate that such steps are already being planned here and there. To those, J. S. Vollema's discussion in the *Archief v. d. Rubber* of the main points in replanting should prove helpful. He does not recommend supplying or partial rejuvenation, as past experience has shown that results are frequently disappointing; he advises instead complete replanting of an entire area with high-grade material.

Before the old trees are cut out, they are to be heavily tapped for a year or so, as conditions permit, in order to obtain as much rubber from them as possible. Restriction affords the opportunity of doing so and saving on the tapping costs while at the same time a larger area of younger rubber is rested.

A good deal has of late been written concerning the large areas of old rubber which will soon cease to be profitable to exploit, when, it is pointed out, a shortage of rubber might result. Replanting programs are therefore of great interest and importance all around.

Malaya

A few years ago the cessation of Sunday tapping was widely advocated as a means of effecting the restriction of output about 14%. The subject was recently brought up in an article in the *Planter* and also at a meeting of the Incorporated Society of Planters. It was claimed that Sunday rest restores the natural equilibrium between production and consumption, stabilizes the industry; benefits the trees, being a natural law of cell life and is the scientific basis of all systems of tapping. It will insure maximum yielding power, bark renewal, growth, foliage, and resistance to disease; and is the essence of simplicity, eminently workable and applies not only to rubber, but to all commodities where work is still carried on seven days a week. The enforcement of a no-tapping Sunday law would lead to the stabilization of restriction, which would lead to the stabilization of the industry, and this again would lead to generally improved conditions and stability for everyone.

At functions tendered in his honor by planting communities, the new governor, Sir Shenton Thomas, made it quite clear that he was not in favor of aiming at unduly high prices for rubber. He warned planters not to bank too heavily on higher prices and stated that what was wanted in Malaya was a steady and sufficiently remunerative price that would not interfere with the expansion of new uses. He advised planters to prepare for future slumps by getting their costs down to the lowest minimum compatible with full efficiency of estates.

At a gathering of proprietary planters, at which the governor was the guest of honor, Dr. Braddon, well-known as the author of schemes for boosting rubber prices to fantastic heights, attacked the United Planting Association of Malaya, which, he stated, represented not the planting community, but the agency houses. The former, he claimed, desired a much higher price, say 1s. a pound, but the agency houses opposed this. Sir Shenton Thomas in reply repeated his warning against any striving for high prices and answered the criticisms against the planting association in question by stressing the need of unity among planters if they expected to be heard by him or by the government.

As to prices, it may be noted that not only proprietary planters, but also certain of the larger companies are dissatisfied with the present level, particularly in view of the mounting costs of production, and more than one recent report touches on the matter. But the companies are more modest than the proprietary planters; the latter speak of 1s. a pound as a reasonable price, and many would undoubtedly like to go higher still; the former, however, would be content with 9d. a pound.

February Exports

A telegram to the Malayan Information Agency states that the quantity of dry rubber exported under the Regulation Scheme from the Malayan area during February, 1935, was 31,843 tons. This should not be confused either with total production or ocean shipments.

South Africa

The Commercial Agent in South Africa, appointed by the Netherland India Government, recently reported on the possibilities of selling raw rubber in that territory. It appears that rubber imports have been increasing at a comparatively rapid rate under the stimulus of the expansion of local rubber factories and improved economic conditions. In his report the agent distinguishes between unworked rubber and crepe. In 1929 imports of the former were 499,503 pounds and subsequently increased until in 1933 the total was 1,331,116 pounds. Of this 90% came from the Straits Settlements, but this amount undoubtedly included rubber originating from Borneo and Sumatra. Imports of crepe rose from 204,354 pounds in 1929 to 923,384 pounds in 1933, and in the latter year the main source of supply was Netherland India, which sent 75% of the total.

The unworked rubber, it appears, enters free of duty and is used primarily by tire and footwear factories. Large quantities of cheap Japanese footwear had been entering the country, but this invasion has been checked by special anti-dumping duties.

In Durban, Natal, the authorities have initiated the use of strips of crepe rubber under street-car tracks in an attempt to lessen street noises. It is expected the rubber will not only give satisfaction in this respect, but will also help to prolong the life of the track by reducing wear and tear.

Indo-China

The Union of Planters of Rubber in Indo-China addressed a letter to the Governor requesting that the balance of the proceeds from the special rubber export duty now being levied to cover expenses in connection with the International Rubber Agreement be utilized for the benefit of rubber growers. It is suggested that part of this sum be placed at the disposal of the Technical and New Uses for Rubber Committee, at Paris. This organization was formed in 1931 with M. Blanchard de la Brosse as president. The committee has been active in the experiments with rubber paving that have been undertaken from time to time in Paris. Another part of the funds, the planters request, be used for propaganda purposes, as for making films of local rubber plantations with a view to acquainting the French public with Indo-China rubber and gaining favor for it.

De Schepper Process[1]

A process known as the de Schepper process for manufacturing powdered rubber from latex has been patented[2] and the patent rights acquired by an English company.[3]

In the de Schepper process latex is sprayed on a moving endless heated rustless steel belt where it forms large globules. The steel belt then passes through a chamber 100 feet long by 6 feet high, heated from 90 to 120° C. The latex on the belt is dehydrated during the passage forming small globules of dry rubber.

The advantages that are claimed for this process are: the conversion of latex into rubber within the space of one day; no use of chemicals for coagulation; no rolling presses or drying (or smoke) houses required; less labor personnel, as the process is very rapid; a yield of dry rubber 7% or 8% higher than that obtained by the coagulation process; a saving ranging from 19% to 40% in the time and power required for the manufacture of rubber articles from rubber powder; by the use of rubber powder, a saving of 10% in the quantity of rubber needed for the manufacture of finished articles.

[1] From a report by K. S. Patton, Consul General, Amsterdam, Netherlands.
[2] de Schepper, British patent No. 392,592 (1933).
[3] The Rubber Powder Co., Ltd., 20 Copthall Ave., London, E.C.2, England.

Patents and Trade Marks

MACHINERY

United States

19,444 (Reissue). **Conductor Vulcanizer.** L. F. Lamplough, Baltimore, Md., assignor to Western Electric Co., Inc., New York, N. Y.

19,460 (Reissue). **Jar Cap Gasket Former and Applier.** M. G. Parks, Dayton, O., assignor to Crown Cork & Seal Co., Inc.

1,989,362, 1,989,363, and 1,989,364. **Vulcanizer.** C. Iverson, assignor to National Rubber Machinery Co., both of Akron, O.

1,989,438. **Die Casting Apparatus.** H. J. Woock and E. A. Glynn, assignors to Super Mold Corp., all of Lodi, Calif.

1,989,474. **Tube Former.** G. E. Disney, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,989,646. **Mold.** J. C. Tuttle, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,989,690. **Sheet Material Looper.** C. H. Heldenbrand, U. C. Haren, and F. Slusher, all of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

1,990,091. **Molding Apparatus.** F. J. Pfeifle, assignor to Mechanical Mold & Machine Co., both of Akron, O.

1,990,455. **Vulcanizing Heater.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

1,990,611. **Tire Spreader.** H. J. Mutchler, Stayton, Ore.

1,990,749. **Coating Apparatus.** R. S. Phillips, Cleveland, and R. G. Carlin, Shaker Heights, assignors to Cleveland Liner & Mfg. Co., Cleveland, O.

1,990,907. **Pile Fabric Apparatus.** W. D. Kellogg, assignor to Mohawk Carpet Mills, Inc., Amsterdam, N. Y.

1,990,995. **Cord Tester.** G. D. Mallory, assignor to Wingfoot Corp., both of Akron, O.

1,991,380. **Patch Vulcanizing Outfit.** G. S. Dawe, Mortdale, N. S. W., Australia.

1,991,470. **Solid Rubber Article Mold.** V. L. Smithers, Akron, O.

1,991,664. **Electrically Operable Press.** P. De Mattia, Passaic, N. J., assignor to National Rubber Machinery Co., Akron, O.

Dominion of Canada

347,720. **Latex Spreader.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of R. J. O'Brien, Rutherford, and F. R. Chappell, Passaic, co-inventors, both in N. J., U. S. A.

347,789. **Fabric Coater.** H. Dreyfus, London, assignee of A. Mellor and R. J. Mann, co-inventors, both of Spondon, all in England.

348,012, 348,013, and 348,014. **Centrifugal Separator.** De Laval Separator Co., New York, N. Y., U. S. A., assignee of H. O. Lindgren, Appelviken, Sweden.

348,170. **Article Assembling Conveyer.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. L. Patten, New Haven, Conn., U. S. A.

United Kingdom

417,967. **Tire Core Remover.** Firestone Tyre & Rubber Co., Ltd., Brentford.

418,185. **Clamping Device.** Wingfoot Corp., Akron, O., U. S. A.

418,463. **Jointing Apparatus.** Firestone Tyre & Rubber Co., Ltd., Brentford. (Firestone Tire & Rubber Co., Akron, O., U. S. A.)

418,705. **Plasticator.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)

418,762. **Article End Joiner.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and H. Smith, both of Birmingham.

418,763. **Rubber Cutter.** Dunlop Rubber Co., Ltd., London, and H. Willshaw and H. Smith, both of Birmingham.

418,930. **Tire Retreader.** A. E. Burch and F. W. Smith, both of Moonee Ponds, Victoria, Australia.

419,244. **Tire Builder.** Firestone Tyre & Rubber Co., Ltd., Brentford. (Firestone Tire & Rubber Co., Akron, O., U. S. A.)

Germany

608,110. **Device to Make Rubber Threads.** Revere Rubber Co., Providence, R. I., U. S. A. Represented by C. Wiegand, Berlin.

609,200. **Disk and Ring Cutter.** Firma Max Muller, Hannover-Hainholz.

609,498. **Tire-Repair Vulcanizer.** A. Pohl, Berlin-Lichtenrade.

609,645. **Equipment for Making Tires by Continuous Process.** Morgan & Wright, Detroit, Mich., U. S. A. Represented by C. and E. Wiegand, both of Berlin.

610,011. **Tire Mold and Vulcanizing Press.** Dunlop Rubber Co., Ltd., London, England. Represented by B. Kaiser and E. Salzer, both of Frankfurt a.M.

610,160. **Device for Vulcanizing Soles on to Footwear.** M. Laura, Saronno, Varese, Italy. Represented by E. and W. Meissner, both of Berlin.

PROCESS

United States

1,989,140. **Raincoat.** A. Lefkowitz, Jackson Heights, assignor to Beyerle Mfg. Co., Inc., Brooklyn, both in N. Y.

1,989,241. **Latex Creaming.** J. McGavack, Leonia, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

1,989,467. **Rubber Soled Shoe.** F. P. Schaffer, Belmont, Mass.

1,989,643. **Inner Tube.** P. W. Litchfield, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,989,676. **Decorated Article.** V. H. Bodle, Newton, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

1,989,702. **Multicolored Article.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,989,703 and 1,989,704. **Decorated Article.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,989,717. **Rubber Article.** A. Szegvari, assignor to American Anode, Inc., both of Akron, O.

1,989,853. **Rubber Soled Shoe.** S. J. Finn, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,989,956. **Tire.** R. H. Ulrich, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,990,248. **Waterproof Fibrous Tubing.** H. Parker, assignor to Brown Co., both of Berlin, N. H.

1,990,460. **Sponge Rubber from Latex.** H. R. Minor, Oak Park, assignor to Liquid Carbonic Corp., Chicago, both in Ill.

1,990,637. **Container.** A. O. Daller, Dennisport, Mass., assignor to Daller Carton Co., Inc., New York, N. Y.

1,990,737. **Abrasive Product.** J. N. Kuzmick and J. A. Lange, assignors to Raybestos-Manhattan, Inc., all of Passaic, N. J.

1,990,844. **Electrical Insulating Material.** W. S. Smith, Newton Poppleford, H. J. Garnett, Sevenoaks, J. N. Dean, Orpington, B. J. Habgood, Bournemouth, and H. C. Channon, London, all in England.

1,990,937. **Rubber Article.** D. H. Forbes, assignor to Armstrong Cork Co., both of Lancaster, Pa.

1,990,996. **Adhesive.** J. Y. Malone, Milwaukee, Wis.

1,991,009. **Printing Plate.** T. C. Browne, Hinsdale, Ill., and A. C. Buttfield, No. Plainfield, N. J.

1,992,062. **Textile Fabric Impregnation.** J. H. Fenner, assignor to J. H. Fenner & Co., Ltd., Hull, England.

Dominion of Canada

347,718. **Seamless Diaphragm.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of R. P. Rose, Jackson Heights, L. I., N. Y., U. S. A.

347,719. **Fiber and Rubber Article.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of G. W. Trobridge, Birmingham, England.

347,999. **Electric Cable.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of C. O. Hull, Stratford, Conn., U. S. A.

348,115. **Tire.** W. J. Fraser, Toronto, Ont.

348,118. **Rubber Article.** W. Kay, Bury, England.

348,227. **Rubber Thread, Cords, and Strips.** U. Pestalozza, inventor, and Societa Italiana Pirelli, assignee of one-half the interest, both of Milan, Italy.

United Kingdom

417,559. **Coating Webs.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

418,012. **Compound Fabric.** Dunlop

Rubber Co., Ltd., London, and E. W. Madge, Birmingham.

418,034. **Inking Pad.** Dunlop Rubber Co., Ltd., London, and F. W. Warren, Manchester.

418,035. **Bonding Rubber to Articles.** Dunlop Rubber Co., Ltd., London, G. Livings, Manchester, and B. W. D. Lacey, Birmingham.

418,240. **Molding Gloves.** L. Landau, London.

418,467. **Coated Fabric.** R. F. McKay, Birmingham. (International Latex Processes, Ltd., St. Peter's Port, Channel Islands.)

418,559. **Connecting Uppers in Insoles and Soles.** W. W. Triggs, London. (Compo Shoe Machinery Corp., New York, N. Y., U. S. A.)

419,015. **Perforated Rubber Sheets.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

419,629. **Filter Plates.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

Germany

608,682. **Making Rubber Thread.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

609,713. **Hard Rubber Hollow Articles.** Kaysam Syndicate, Ltd., London, England. represented by G. Lotterhos, Frankfurt a. M., and M. Eule, Berlin.

609,947. **Process and Device for Making Rubber Thread.** Societa Italiana Pirelli and U. Pestalozza, both of Milan, Italy. Represented by A. Bursch, Berlin.

CHEMICAL

United States

1,989,226. **Accelerator.** C. Coleman, Passaic, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

1,989,246. **Plastic Composition.** M. C. Reed, Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

1,989,469. **Accelerator.** J. Teppema, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

1,989,632. **Transparent Film.** W. C. Calvert, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.

1,989,788. **Age Resister.** W. S. Calcott and W. A. Douglass, both of Pennsgrove, N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,990,292. **Fireproofing Composition.** M. Leatherman, Hyattsville, Md.; dedicated to the free use of the public.

1,990,609 and 1,990,610. **Accelerator.** H. Meis, Leverkusen-Wiesdorf, assignor to I. G. Farbenindustrie A. G., Frankfurt a. M., both in Germany.

1,990,658. **Reclaimed Rubber.** G. F. Lane, assignor to Philadelphia Rubber Works Co., both of Akron, O.

1,990,906. **Antiscorch.** M. Jones, Crumpsall, and W. J. S. Naunton, Prestwich, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

1,991,300. **Anticorrosion Compound.** G. Tichy and H. Klas, both of Dusseldorf, Germany.

1,991,367. **Aqueous Rubber Dispersion.** A. Beck and M. Mueller-Cunradi, both of Ludwigshafen a. Rhine, assignors to I. G. Farbenindustrie A. G., Frankfurt a. M., all in Germany.

1,991,402. **Thickening Latex.** J. McGavack, Leonia, N. J., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

1,991,726. **Chewing Gum Base.** O. J. Boser, assignor to Chemische Fabrik von Heyden A. G., both of Radebeul, Germany.

1,991,860. **Accelerator.** E. W. Madge, Birmingham, assignor to Dunlop Rubber Co., Ltd., London, both in England.

Dominion of Canada

347,708. **Chlorinated Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M., assignee of L. Orthner and O. Böhme, both of Leverkusen-I. G. Werke, and G. Meyer and W. Becker, both of Koln-Mulheim, co-inventors, all in Germany.

347,747. **Accelerator.** Rubber Service Laboratories Co., Akron, O., assignee of J. H. Fentress, Nitro, W. Va., both in the U. S. A.

347,865. **Carbon Black Aqueous Dispersion.** Dewey & Almy Chemical Co. of Canada, Ltd., Farnham, P. Q., assignee of G. R. Tucker, No. Andover, Mass., U. S. A.

348,034. **Rubber Solution.** J. R. Geigy A. G., assignee of C. von Leesen, both of Basle, Switzerland.

348,070. **Accelerator.** Rubber Service Laboratories Co., Akron, O., assignee of M. W. Harman, Nitro, W. Va., both in the U. S. A.

348,171. **Abrasion Resisting Rubber Stock.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Grosse Pointe Village, Mich., U. S. A.

United Kingdom

418,068. **Chlorinated Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

418,069. **Halogenized Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.

418,201. **Rubber Composition.** A. L. Hock, A. Kirkham, H. Spence, and P. Spence & Sons, Ltd., all of Manchester.

418,290. **Plastic Composition.** Naamlooze Vennootschap Rotterdamsche Handelen Crediet Maatschappij, Kootwijk, Holland.

418,374. **Antioxidant.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

418,376 and 418,445. **Accelerator.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

418,557. **Rubber Composition.** Siemens & Halske A. G., Berlin, Germany.

418,667. **Coloring Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)

418,757. **Latex Porous Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and D. F. Twiss and W. McCowan, both of Birmingham.

418,976. **Chlorinated Rubber.** J. Halden & Co., Ltd., and J. Halden, both of Reddish.

419,021. **Latex Thread.** R. Pickles, Burnley, and J. Pickles, Fence.

Germany

610,227. **Rubber Conversion Products.** I. G. Farbenindustrie A. G., Frankfurt a. M.

GENERAL

United States

19,443 (Reissue). **Hydraulic Diaphragm Brake.** J. A. De Vito, Hawthorne, Calif., assignor to Bendix Brake Co., South Bend, Ind.

1,989,115. **Pneumatic Shutter Mechanism.** U. M. Schmidt, assignor of one-fourth to G. C. Willcox, both of Saginaw, Mich.

1,989,168. **V-Belt.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

1,989,201. **Cleaner or Applicator.** E., L. J., and V. L. Kurtz, all of Cleveland, O.; L. J. and V. L. Kurtz, assignors to E. Kurtz.

1,989,276. **Upholstery Molding.** A. L. Howard, assignor to Hamilton-Wade Co., both of Brockton, Mass.

1,989,282. **Electrode.** H. E. Kimble, Chicago, and H. J. Holmquest, Oak Park, assignors to General Electric X-Ray Corp., Chicago, all in Ill.

1,989,309. **Dress Back Protector.** G. G. Fowler, Stockton, Calif.

1,989,338. **Wheel.** A. F. W. Ruske, San Francisco, Calif.

1,989,402. **Tire.** H. N. Cupp, Mars, Pa.

1,989,483. **Lamp Cord.** E. H. Lewis, Bridgeport, Conn., assignor to General Electric Co., a corporation of N. Y.

1,989,563. **Electrical Insulating Material.** W. S. Smith, Benchams, H. J. Garnett, Lymne, H. C. Channon, London, and J. N. Dean, Kincraig, all in England.

1,989,580. **Hydraulic Ram.** D. F. Asbury, Broomes Island, Md.

1,989,613. **Shoe.** J. E. Disch, assignor to Daniel Green Co., both of Dolgeville, N. Y.

1,989,752. **Uni-Plural Plugging In and Switch Device.** H. H. Ice, Muskogee, Okla.

1,989,757. **Tire.** C. G. Kranz, Chicago, Ill.

1,989,895. **Elastic Material.** J. O. Van Gilder, Columbus, O.

1,989,902. **Shoe and Sole Therefor.** H. Westling, Watertown, Mass.

1,989,990. **Fountain Pen.** C. R. Keeran, Evanston, assignor to Wahl Co., Chicago, both in Ill.

1,989,994. **Tire Valve.** J. D. Lear, assignor to Sterling Automotive Products Corp., both of Buffalo, N. Y.

1,990,080. **Moistureproof Material.** L. L. Leach, Buffalo, and J. C. Siemann, Kenmore, assignors to Du Pont Cellophane Co., Inc., New York, N. Y.

1,990,210. **Stocking Protector.** M. S. Silver, Brookline, Mass.

1,990,225. **Mandible Developer.** C. O. Edwards, Oakland, Calif.

1,990,353. **Inflatable Ball.** W. A. Sonnett, assignor to P. Goldsmith Sons Co., both of Cincinnati, O.

1,990,374. **Inflatable Article Valve.** H. Goldsmith, Cincinnati, O.

1,990,411. **Mouth Breathing and Snoring Preventive.** O. Lowry, Meridian, Miss.

1,990,441. **Fountain Pen.** A. H. Stenersen, assignor to Wahl Co., both of Chicago, Ill.

1,990,553. **Mitt.** M. Koffler and J. Hirsch, both of Brooklyn, N. Y.

1,990,556. **Funnel.** E. D. MacArthur, Old Hickory, Tenn., assignor to Du Pont Rayon Co., New York, N. Y.

1,990,557. **Slush Pump Valve.** J. Melott, assignor to C. E. Brown, both of Los Angeles, Calif.

1,990,802. **Vehicle Spring.** T. H. Thompson, Akron, O.
1,990,836. **Elastic Fabric.** T. F. Moore, assignor to George C. Moore Co., both of Westerly, R. I.
1,990,866. **Aircraft Ice Overshoe.** D. Gregg, Caldwell, assignor, by mesne assignments, to Eclipse Aviation Corp., E. Orange, both in N. J.
1,990,912. **Ice Manufacturing System.** J. A. Martocello, Sr., Philadelphia, Pa.
1,990,976. **Storage Battery Plate Protector.** F. E. E. Booss, Lancaster, assignor to Gould Storage Battery Corp., Depew, both in N. Y.
1,991,168. **Waterproof Coverage.** J. E. Marble, Passaic, N. J.
1,991,172. **Hose Supporter.** C. C. Platt, New York, N. Y.
1,991,254. **Shackle Joint.** H. C. Lord, Erie, Pa.
1,991,278. **Cervical Applicator.** J. S. Heintz and S. Naikelis, both of Chicago, Ill.
1,991,345. **Medicine Dropper.** M. N. Durand, Ridley Park, Pa.
1,991,534. **Tennis Ball.** G. H. Wood, Worcester, assignor to Felters Co., Boston, both in Mass.
1,991,579. **Torsional Reactance Dampener.** F. W. Sampson, assignor to Inland Mfg. Co., both of Dayton, O.
1,991,594. **Tire Fluid-Tight Joint.** E. R. Case, Toronto, Ont., Canada.
1,991,643. **Bumper and Weather Seal.** A. F. Wintercorn, assignor to Atwood Vacuum Machine Co., both of Rockford, Ill.
1,991,739. **Running Board.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.
1,991,832. **Soundproof Window.** S. J. Zand, Forest Hills, assignor to Sperry Gyroscope Co., Inc., Brooklyn, both in N. Y.
1,991,943. **Waterproof Closing Means.** L. V. Keviczky, New York, N. Y.
1,991,974. **Springless Tire Valve Inside Construction.** L. C. Broecker, assignor to Bridgeport Brass Co., both of Bridgeport, Conn.
1,992,135. **Frozen Confection Machine.** R. C. Underwood, assignor to New York Eskimo Pie Corp., both of Brooklyn, N. Y.
1,992,152. **Tobacco Pouch.** P. M. Yeates, assignor to Seal-O-Sac (Canada), Ltd., both of Toronto, Ont., Canada.

Dominion of Canada

347,635. **Ladder Gripping Device.** H. W. Lang, Lebanon, N. H., U. S. A.
347,711. **Elastic Textile Product.** "Le Filastic," Lille, Nord, assignee of L. S. M. Lejeune, Paris, and E. J. A. Lejeune, La-Madeleine-Lez-Lille, co-inventors, all in France.
347,768. **Joint.** Thompson Products, Inc., assignee of G. H. Hufferd and M. P. Graham, co-inventors, all of Detroit, Mich., U. S. A.
347,804. **Foot Corrective Device.** A. L. Bennett, Windsor, Ont.
347,820. **Massage Device.** W. A. Hardman, New York, N. Y., U. S. A.
347,835. **Vehicle Windshield and Window.** J. Reid, Calgary, Alta.
347,864. **Milking Machine.** De Laval Separator Co., New York, N. Y., assignee of C. H. Hapgood, Nutley, N. J., both in the U. S. A.
347,964. **Drain Flusher.** J. J. McEwan, Pontiac, Mich., U. S. A.
347,986. **Artificial Leather.** Beckwith Box Toe, Ltd., Sherbrooke, P. Q., assignee of F. O. Woodruff, Newton, Mass., U. S. A.
347,996. **Shock Absorbing Mounting.** Canadian Car & Foundry Co., Ltd., assignee of E. R. Viberg, both of Montreal, P. Q.
348,069. **Belt.** Raybestos-Manhattan, Inc., Passaic, assignee of D. Repony, Clifton, and J. H. Matthews, Nutley, co-inventors, all in N. J., U. S. A.
348,073. **Electrical Insulation.** Simplex Wire & Cable Co., Boston, assignee of C. R. Boggs, Waban, both in Mass., U. S. A.
348,075. **Garment.** Snuggle Rug Co., assignee of V. L. Stephenson, both of Goshen, Ind., U. S. A.
348,076. **Badminton Racket.** A. G. Spalding & Bros. (Canada), Ltd., Brantford, Ont., assignee of J. B. Dickson, Northampton, Mass., U. S. A.
348,085. **Hosiery.** Vanity Fair Silk Mills, assignee of H. B. Snader, both of Reading, Pa., U. S. A.
348,145. **Hollow Heel.** J. Gibby, Kew, Victoria, Australia.
348,172. **Moistureproof Material.** Du Pont Cellophane Co., Inc., Wilmington, Del., assignee of L. L. Leach and J. S. Siemann, co-inventors, both of Kenmore, N. Y., all in the U. S. A.
348,209. **Pressure Gage.** A. Schrader's Son, Inc., New York, assignee of S. T. Williams, Bellerose, L. I., both in N. Y., U. S. A.

United Kingdom

416,942. **Shock Absorber.** J. Lucas, Ltd., and H. W. Pitt, both of Birmingham.
417,010. **Golf Club.** Metallic Shaft Co., Wilmington, Del., U. S. A.
417,317. **Toy Boat.** C. L. Mogensen, Copenhagen, Denmark.
417,356. **Toy Gun.** H. Grafe, Dresden, Germany.
417,407. **Corset.** Warner Bros. Co., assignee of J. Field, both of Bridgeport, Conn., U. S. A.
417,409. **Globe.** G. Philip & Son, Ltd., and F. S. Young, both of London.
417,447. **Floor Cleaner.** F. Phillips, Bristol.
417,508. **Metal Container.** Rothman's, Ltd., and H. Wyner, both of London.
417,542. **Trousers.** N. Golinger, Mt. Lawley, Western Australia.
417,546. **Fountain Pen.** F. B. Dehn, London. (Parker Pen Co., Janesville, Wis., U. S. A.)
417,629. **Flexible Coupling.** G. E. Stanley, Coventry.
417,658. **Aircraft Rudder.** Bendix Aviation Corp., Chicago, Ill., U. S. A.
417,667. **Glass Bulb Treater.** Rogers Radio Tubes, Ltd., Toronto, Ont., Canada.
417,769. **Web Feeder.** Jagenbergwerke A. G., Düsseldorf, Germany.
417,775. **Brassiere.** B. H. Norman and R. & W. H. Symington & Co., Ltd., both of Market Harborough.
417,778. **Centrifugal Fan.** P. Pfeiffer, E. Faber, and L. Hahn, (trading as Mauz & Pfeiffer), all of Stuttgart, Germany.
417,793. **Stopper.** G. E. Rimer, London.
417,844. **Railway Vehicle Undercarriage.** J. Bugatti, Molsheim, Bas-Rhin, France.
417,870. **Glass Polisher.** Pilkington Bros., Ltd., Liverpool, and J. H. Griffin, Moss Bank.
417,900. **Tray.** R. Sandland, Clifton.
417,906. **Vacuum Closure for Tins.** R. Dette, Nieder-Ingelheim-on-Rhine, Germany.
417,987. **Wristwatch Band.** B. Furst, assignee of Furst & Hoeft, both of Berlin, Germany.
417,994. **Poultry Plucker.** A. G. Budd and H. Barton, both of Dorset.
418,021. **Corset.** L. I. Malmstead, Worcester, Mass., U. S. A.
418,028. **Electric Battery Carrier.** Britannia Batteries, Ltd., London, assignee of Accumulatoren-Fabrik A.G., Berlin, Germany.
418,036. **Knickers.** A. Siebert & Co., Ltd., and A. F. Siebert, London.
418,045. **Golf Practising Appliance.** H. V. S. Home, Aberdeen, Scotland.
418,058. **Insole.** J. C. Scotton, New Barnet.
418,093. **Toy Catapult Device.** L. Marx & Co., Ltd., Dudley. (L. Marx & Co., Inc., New York, N. Y., U. S. A.)
418,098. **Typewriter.** W. W. Triggs, London. (Underwood Elliott Fisher Co., New York, N. Y., U. S. A.)
418,118. **Rubber Thread.** R. Pickles, Burnley, J. Pickles, Fence, and J. Okell, Osterley.
418,131. **Hypodermic Syringe.** E. Rippstein, Basle, Switzerland.
418,182. **Road Surface Marking.** Dunlop Rubber Co., Ltd., and F. M. B. Fisher, both of London.
418,197. **Sink Edge Covering.** W. F. C. Howie, Kilmarnock.
418,237. **Flexible Shaft.** W. H. Wall, Birmingham.
418,243. **Bathing Raft.** T. L. Green, Rye.
418,248. **Vehicle Body.** Duramin Engineering Co., Ltd., London, and E. L. Oglethorpe, Harrow.
418,277. **Telephone Receiver Cushion.** S. Altschuler, Brussels, Belgium.
418,293. **Tire.** J. Macmillan, London.
418,326. **Catamenial Appliance.** Coezene Co., Cleveland, O., assignee of L. J. Goddard, Miami, Fla., both in the U. S. A.
418,339. **Trouser Waistband.** Rego Clothiers, Ltd., and A. G. Rossiter, both of London.
418,354. **Bather's Purse.** J. Feveile, Gentofte, Denmark.
418,359. **Vibration Damper.** P. C. A. M. D'Aubarede, St.-Genis Laval, Rhone, France.
418,401. **Horseshoe.** O. Harsem, Oslo, Norway.
418,410. **Telegraphic System.** A. D. Eitzen, Rockville Centre, N. Y., U. S. A.
418,418. **Corset.** G. Damont, Lyons, France.
418,419. **Pole Climber.** C. Castelli, Milan, Italy.
418,470. **Electric Battery Lamp.** B. Rogge, assignee of B. Rogge Metallwaren-Fabrik, both of Berlin, Germany.
418,482. **Bed Underlay.** R. and E. Jooss and E. Saur, (trading as C. F. Ploucquet,) all of Heidenheim-on-Brenz, Germany.
418,485. **Ventilated Boot.** O. Mavaut, Boucoiran, Gard, France.
418,514. **Impact Pulverizer.** H. O. Jones, Broxbourne.
418,519. **Adjustable Stand.** Brookes & Adams, Ltd., and A. E. Brookes, both of Birmingham.
418,546. **Copy Holder.** N. Dodds, Washington, D. C., U. S. A.
418,549. **Pulley.** H. B. Greening, Hamilton, Ont., Canada.
418,574. **Hat Cover.** R. E. Hope-Falkner, Singapore, S. S.

418,583. **Gramophone.** A. Freeman, Kettering.
418,589. **Filter.** T. O. Wilton and Chemical Engineering & Wilton's Patent Furnace Co., Ltd., both of London.
418,595. **Child's Walk Teaching Appliance.** J. N. Hudson, Newcastle-on-Tyne.
418,669. **Insole.** United Shoe Machinery Corp., Boston, assignee of J. M. Whelton, Peabody, both in Mass., U. S. A.
418,678. **Gramophone Pick-Up.** W. M. Braun, Frankfurt a. M., Germany.
418,685. **Fruit Grader.** J. Stoddart, Surbiton.
418,693. **Tire Pressure Gage.** B. Walters, Sheffield.
418,699. **Roller Skate.** R. Pearmain, London.
418,720. **Table Game Apparatus.** W. Boessow, Lankwitz-Sud-Berlin, Germany.
418,722. **Compound Sheet Material.** T. Rowbotham & Co., Ltd., T. Rowbotham, and W. Shaw, all of Stockport.
418,768. **Battery Container Covering.** Britannia Batteries, Ltd., London, assignee of Accumulatoren-Fabrik A. G., Berlin, Germany.
418,791. **Motor Car Bonnet Fastening.** A. Auchterlounie, Edinburgh, Scotland.
418,795. **Hair Curler.** R. G. Bedwell, London.
418,800. **Pneumatic Upholstery.** A. Janisch, Leipzig, Germany.
418,807. **Bottle Stopper.** R. N. Mashal, Rhos-on-Sea.
418,813. **Wrapping Machine.** H. Bassat, Solingen, Germany.
418,820. **Tire.** Dunlop Rubber Co., Ltd., London, and F. G. W. King, Birmingham.
418,833. **Corset.** L. C. Lisi, Florence, Italy.
418,881. **Hair Curler.** E. Hasler, Lausanne, Switzerland.
418,923. **Water Depth Indicator.** E. C. Hillman, Nottingham.
418,959. **Dialyzing Apparatus.** A. J. S. Hooton, Romford, H. H. Davis, Goodmayes, and S. H. Johnson & Co., Ltd., London.
418,970. **Vehicle Wheel.** G. S. Frame, Colchester.
419,094. **Door Stop.** W. A. Hamill, Four Oaks.
419,118. **Trousers.** W. A. Hogg, Ltd., and W. A. Hogg, both of Leeds.
419,153. **Book Cover Edge Protector.** H. B. Stone, Croydon, and P. H. Jones, Beckenham.
419,169. **Billiard Table.** Etablissements O. Wambreuse & Cie Soc. Cooperative, Brussels, Belgium.
419,204. **Optical Sound Recorder.** H. W. Aldrich and W. Gannon, both of Brighton.
419,205. **Gramophone.** General Electric Co., Ltd., London, and H. C. E. Jacoby, Birmingham.
419,262. **Trouser Waistband.** A. L., J. L., and E. L. London, (trading as L. London & Sons), all of London.
419,385. **Suction Disk Fastening.** A. G. Barrett and Leicester Rubber Co., Ltd., both of Leicester.
419,392. **Diaphragm Vibrator.** E. J. Barnes, London, R. E. Swift, Wembley, O. W. Gill, So. Harrow, and J. Wood, London.
419,428. **Glove.** E. Zinner, Hannover, Germany.

Germany

608,566. **Heel with Suction Cup.** A. Nusken, Wuppertal-Barmen.
608,652. **Tire Defect Indicator.** W. Harlass and R. Kappl, both of Munich.
609,437. **Resilient Joint.** Continental Gummi-Werke A. G., Hannover.

TRADE MARKS

United States

321,378. **"Uterex."** Latex. American Anode, Inc., Akron, O.
321,387. **Pliofilm.** Wrapping, packaging, and covering material. Goodyear Tire & Rubber Co., Akron, O.
321,424. **Edgebrook.** Golf balls. United States Rubber Co., New York, N. Y.
321,425. **Riptide.** Golf balls. United States Rubber Co., New York, N. Y.
321,426. **Yankee.** Golf balls. United States Rubber Co., New York, N. Y.
321,475. **Factice.** Compounds, particularly vulcanized vegetable oils used in producing rubber substitutes. Stamford Rubber Supply Co., Stamford, Conn.
321,564. Label containing the word: **"Rubatex."** Structural material of rubber composition for heat and sound insulations, life preservers, rafts, etc. Rubatex Products, Inc., Wilmington, Del.
321,766. **Rublan.** Raincoats. Plymouth Rubber Co., Inc., Canton, Mass.
321,769. **Concentrolac.** Rubber latices. Heveatex Corp., Melrose, Mass.
321,826. **Illusion.** Shower curtains and window drapes. I. B. Kleinert Rubber Co., New York, N. Y.
321,868. **Grey-Rock Balanced Brakset.** Brake linings. Raybestos-Manhattan, Inc., Passaic, N. J.
321,895. **Spongex.** Rug underlays, bath mats, and kneeling pads. Sponge Rubber Products Co., Derby, Conn.
321,971. **Plylastic.** Rubber thread. United Elastic Corp., Easthampton, Mass.
321,979. **Pluralastic.** Rubber thread. United Elastic Corp., Easthampton, Mass.
321,984. Label containing the words: **"The Belmont Packing & Rubber Co. -o- Belmont -o- Philadelphia, U. S. A."** Packing and packing material. Belmont Packing & Rubber Co., Philadelphia, Pa.
321,998. **Tiresole.** Tires. Tiresoles, Inc., Philadelphia, Pa.
322,016. **Harper.** Stationers' supplies including erasers. A. Hauptman, New York, N. Y.

Ohio

(*Continued from page* 55)

The National Rubber Machinery Co., Akron, has been reorganized and the following officers elected: M. D. Kuhlke, chairman of the board and treasurer; Nils Forman, president; Frank V. Brecka, secretary and assistant treasurer; Albert Brown, assistant secretary. The board of directors comprises: Nils Forman, formerly an international banker; Harry J. Smith, assistant to the president and in charge of sales, who is well known both in the foreign and domestic rubber machinery trade; O. J. Kuhlke, Akron representative; John B. Shaub, in charge of plant production; A. Fernande De Krieges, attorney; and Mr. Brecka and Mr. Brown. The new company will continue the manufacture of National tire machinery and tire molds; also a general line of rubber machinery will be manufactured and sold by the new company. Foreign business will receive special attention from Harry J. Smith, sales manager, with headquarters at 11 Broadway, the company's New York, N. Y., offices.

Firestone Tire & Rubber Co., Akron, is reported to be negotiating with Manville-Jenckes Co., Providence, R. I., for the purchase of the latter's factory in Gastonia, N. C., which the rubber concern would utilize to make tire fabric.

The Appelate Court, Akron, recently upheld the decision of a Common Pleas judge that tire molds are "dies" and as such are not subject to tangible taxes as claimed by the Ohio Tax Commission. The suit was brought by The B. F. Goodrich Co., by whose action rubber manufacturers in Ohio will be saved about $250,000 in taxes.

The Republic Rubber Co., Youngstown, through Vice President O. S. Dollison has announced the appointment of Herman P. Schultz as sales manager. Mr. Schultz joined Republic in February, 1922, as manager of the planning division. On November 1, 1929, he became traveling sales manager and on August 31, 1931, manager of mechanical sales.

Great Lakes Power Show & Mechanical Exposition will be held on the lake steamer *Seeandbee* of the Cleveland & Buffalo Transit Co., June 24 to 28. Power equipment, power plant materials and supplies, accessories, manufactured products in allied fields, general industrial equipment, etc., will constitute the chief items on display. The exposition will be assembled in Cleveland, sail to Buffalo, return to Cleveland, then to Detroit, and back to Cleveland.

Franz D. Abbott, formerly with the Goodyear Tire & Rubber Co., Akron, now is technical superintendent of the Ohio Rubber Co., Willoughby.

The Goodrich Foremen's Clubrooms, on the third floor of Building 41, were opened for use the week-end of March 16. These quarters will be scheduled for use of organized Goodrich clubs or groups in an orderly manner through the recreation office.

The Eagle-Picher Lead Co., Cincinnati, reports five important changes in the personnel of the organization. Vice President Ralph W. Roosevelt, in charge of the New York office, has resigned to devote his full time to duties as president of the American Zinc Institute. Vice President Willard E. Maston has been placed in charge of the New York sales division; Vice President F. W. Potts has been appointed general manager; John R. MacGregor, vice president of the Eagle-Picher Sales Co., is to have charge of sales research and product development; and T. C. Carter has been appointed director of sales.

ADVERTISING PAGES REMOVED

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Feb. 2	Mar. 2	Mar. 9	Mar. 16	Mar. 23
Feb.	12.70	.....	.....	.....	.....
Mar.	12.74	12.60	11.91	11.12	10.52
Apr.	12.82	12.62	11.96	11.09	10.57
May	12.90	12.67	12.02	11.10	10.62
July	13.03	12.80	12.16	11.25	10.74
Sept.	13.19	12.94	12.32	11.40	10.88
Dec.	13.43	12.23	12.55	11.65	11.15
Feb.	.....	13.41	12.73	11.82	11.32
Volume for week (tons)	...22,310	29,249	26,050	33,520	25,890

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the trend of prices on representative futures for approximately two consecutive months.

The Supreme Court's decision upholding the gold policy of the administration and the distressing commodity speculation circumstances in the London market were the major influences affecting the Commodity Exchange activities during February. Rapid price changes with wide fluctuations occurred, and the month closed with a 20- to 25-point downward trend.

Week ended March 2. Six thousand to 9,700 tons daily turnover is a measure of the extensive bearish activity that marked the first half of this period, bringing losses of 51 to 54 points. The International Rubber Regulation Committee on February 26 fixed the following percentages of the basic quotas: 75% for April, May, June, 1935, and 70% for July, August, September, 1935. This report and the effect of a break in tin prices in London, involving some of the Exchange members there, caused a bearish commodity market of decided proportions. Later assurances that the tin situation was under control, that the I.R.R.C. reserved the right to effect changes in its quotas at any time that conditions should warrant, the development of a favorable factory demand, and the thoroughness of liquidation tended to change the tone to one of inactivity and dullness. The week closed with 14- to 25-point losses as against the previous week.

Week ended March 9. A drop in sterling and rumors of further bearish developments in the London commodity situation started this period with a disappointing atmosphere, which continued with active liquidation and resultant losses of 20 to 28 points each of the first three days, bringing the price of nearby futures below 12¢; April, for instance, 11.91¢. This condition was reversed for a day when steadier foreign exchanges revived speculator interest here, with gains that brought active short covering and advances of 18 to 22 points. A report of an unexpected cut in tire prices brought about an unsettled frame of mind and with the decline in cotton resulted in a further trend of losses. Declines for the period amounted to 69 to 91 points.

Week ended March 16. The demoralizing break in cotton, a close associate of rubber, caused another liquidation drive on the latter that drove prices down for two days despite reports of further increases to come in motor production. A 25- to 33-point rally came with the recovery of cotton, but it was closely followed with a new outburst of selling because of the pessimism introduced by the cut in tire prices and a reduction in the working days of a large Akron tire factory. Prices continued their substantial declines until the last day of the period, but without apparent fundamental reason for the extent to which confidence of traders seemed to have been destroyed. A moderate rally occurred the closing day as the result of steadying and advancing London markets. The week closed with net losses of 83 to 93 points, bringing April to 11.09¢ from 11.96¢.

Week ended March 23. Growing uncertainties in foreign exchange and international currency directly affected commodities and brought the severest break of the year in rubber futures, which closed the beginning of this period 44 to 49 points below the previous week-end, May 10.63¢ against 11.09¢. Firmness and recovery of this loss featured the following two days, largely because of factory buying at the low prices and active short covering in the oversold market rather than because of improvement of fundamental economic conditions.

The remaining portion of the period was marked with weakness and uncertainty due to the bearish situation that would prevail should the gold bloc countries forsake the gold standard and also to the effect of the chaotic foreign political situation. The period closed with net losses of 48 to 56 points; all futures up to and including October were below 11¢.

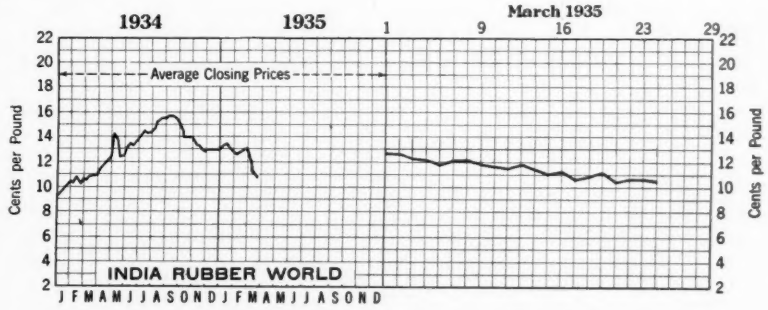
On March 25 favorable news was ignored by rubber. Bullish statistical developments at producing centers did not affect the dull and declining market. An easier London market offset upturns in cotton here, and declining consumption and liberal restriction policies over the first half of 1935 did not help rubber any. Futures at one time were 2 to 6 points above Saturday's final quotations, but could not maintain their gains and closed 7 to 17 points lower. Sales totaled only 1,260 tons. Closing prices follow: March 10.43¢, April 10.48.

During February production and stocks in Malaya declined. Output was 30,109 tons against 38,327 tons in January. Stocks on estates during February totaled 16,783 tons, compared with 17,296 tons in January. Dealers' stocks were 71,958 tons in February and 72,155 tons the previous month.

On March 26 the I.R.R.C. reduced the April-June quotas to 70%, setting the rate at 65% for the rest of the year.

New York Outside Market

February maintained the firm No. 1 smoked sheet spot price level of approximately 13¢ per pound that has prevailed since the latter part of last year, until during the last week of the month when evidence of weakness began to appear. The trend in the past three months together with the period covered by this review will be observed from the following week-end closing prices: December 1, 13 7/16¢; January 5, 13½; February 2, 12 5/8; February 23,



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

13 3/16; March 2, 12 5/16; March 9, 11 13/16; March 16, 11 1/8; and March 23, 10 15/16.

Week ended March 2. The R. M. A. reported 43,187 long tons of crude rubber consumed during February, 1935, which was 8.31% less than the previous month, but 6.4% more than in February, 1934. Imports were 35,383 long tons, 15.9% less than in January, but 14% above February, 1934. Stocks of rubber in the United States at the end of February were 337,332 long tons as against the end of January stocks of 346,084, and that of February 28, 1934, of 358,681. The break of prices in the futures market during the fore part of this week and the weakness during the latter part tended to awaken factory interest only at prices just below the sellers' offerings. This action resulted in approximately ½¢ recession during the week in spite of the fact that offerings from the primary markets were notably limited.

Week ended March 9. Reports of substantially reduced far eastern shipments during both January and February were of no consequence in bringing about factory buying in face of the chaotic futures situation, except at concessions from sellers' quotations. Reduction in tire prices also helped the buyers attitude with the result that the spot price broke through the 12¢ level, closing the period at 11 13/16¢.

Week ended March 16. The third successive week beginning with breaks in the futures market caused further withdrawal of buyers and a continued reduction of spot prices. Fluctuations of the futures market seemed to determine the pattern of the outside market rather than such news from the automotive industry that indicates a continued increase in production schedules. No. 1 smoked sheets sold below 11¢ during this period and closed at 11 1/8¢, approximately ¾¢ reduction for the week.

Week ended March 23. Following the example set by the futures market No. 1 smoked sheet broke more than ½¢ per pound to start this period, reaching a low point of 10 1/2¢. Active factory interest at these levels, however, caused fairly rapid recovery to just above the 11¢ level during the next two days. Uncertainty as to currency conditions caused factories to withhold their demands during the latter part of the week, with the result that prices again declined to close the period at 10 15/16¢.

On March 25 Akron factories and other consuming centers showed little interest in crude rubber on the new setback. Dealers' quotations were 1/16¢ less on ribs and latex; while browns and ambers were unchanged. For the day 10 1/2¢ was asked for spot rubber.

The unexpectedly reduced basic quota percentages fixed on March 26 found an oversold market, and spot rubber advanced 131 points; futures closed 125 to 132 points higher.

New York Quotations

New York outside market rubber quotations in cents per pound

Plantations	Mar. 26, 1934	Feb. 23, 1935	Mar. 25, 1935
Rubber latex, normal ....gal.	50	54	48
Sheet			
Ribbed smoked, spot	11 1/8	13 1/16	10 5/8
Apr.-June	11 1/4	13 1/16/13 3/16	10 3/4
July-Sept.	11 1/16/11 5/8	13 1/16/13 5/8	10 7/8/10 13/16
Oct.-Dec.	12	....	11 1/16/11 7/8
Crepe			
No. 1 thin latex, spot	12 7/8/13	13 1/2	11 /11 1/16
Apr.-June	13 /13 1/16	13 3/4/13 7/8	11 1/8/11 1/4
July-Sept.	13 1/4/13 3/8	14 /14 1/8	11 1/4/11 1/2
Oct.-Dec.	13 1/2/13 3/4	....	11 1/2/11 3/4
No. 3 Amber, spot	9 1/4/ 9 3/8	11 3/8/11 1/2	9 5/8/ 9 3/4
No. 1 Brown	9 3/8/ 9 1/2	11 1/2	9 5/8/ 9 7/8
Brown rolled	7 3/8/ 7 5/8	10 1/2/10 5/8	9 3/8/ 9 5/8
Paras			
Upriver fine	10 1/4	9 1/4	9
Upriver fine	*13	*12 3/4	*11 1/2
Upriver coarse	6	7 1/8	6 3/4
Upriver coarse	*10 1/4	*11	*10
Islands fine	9 1/2	8 7/8	8 3/4
Islands fine	*13	*12 3/4	*11
Acre, Bolivian fine	10 1/4	9 3/8	9 1/4
Acre, Bolivian fine	*13 1/4	*13	*11 3/4
Beni, Bolivian	10 1/4	9 7/8	9 3/4
Madeira fine	10	9 3/4	9
Caucho			
Upper ball	6	7 3/8	6 3/4
Upper ball	*10 1/4	*11	*10
Lower ball	5	6 7/8	6 1/2
Pontianak			
Bandjermasin	7	6	6
Pressed block	12	10 1/2	10/11
Sarawak	7	6	6
Manicobas			
Manicoba, 30% guar.	†9 1/4	..	..
Mangabiera, thin sheet	†9 1/4	..	..
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13
Africans			
Rio Nuñez	12	12	12
Black Kassai	10	10	10
Prime Niger flake	18	25	25
Gutta Percha			
Gutta Siak	10 1/2	9 3/4	9 1/2
Gutta Soh	15	14	13
Red Macassar	1.50	1.25	1.25
Balata			
Block, Ciudad Bolivar	42	34	34
Manaos block	42	28	26
Surinam sheets	42	42	36
Amber	48	45	42

*Washed and dried crepe. Shipments from Brazil. †Nominal.

RUBBER SCRAP

THE rubber scrap market for March was quiet, and prices somewhat easier, owing to ample stocks of reclaim and temporary decline of its consumption.

BOOTS AND SHOES. Demand in fair volume exists for these grades, with collections slow. Prices are the same.

INNER TUBES. A very good demand for all grades of tubes was maintained during March both for domestic consumption and export. Prices are firm and unchanged.

TIRES. Supplies are limited and the market dull. Standard pneumatic grades have declined slightly with the exception of auto tire carcasses, which are the same as quoted one month ago.

SOLID TIRES. Clean mixed truck and light gravity grades are in good demand. Prices are unchanged.

MECHANICALS. The demand for all mechanicals is holding up very well, apparently because of the need of the automotive industry for many accessory rubber parts in the manufacture of which reclaim enters as a major component. All grades of mechanical scrap are quoted unchanged from last month.

HARD RUBBER. Hard rubber scrap is scarce, and the price steady and unchanged.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

March 25, 1935

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 1/16/$0.01 1/4
Colored	lb.	.00 3/4/ .00 7/8
Untrimmed arctics	lb.	.00 3/4/ .00 7/8
Inner Tubes		
No. 1, floating	lb.	.07 / .07 1/4
No. 2, compound	lb.	.03 3/8/ .03 1/2
Red	lb.	.02 1/2/ .02 5/8
Mixed tubes	lb.	.02 3/4/ .03
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	8.75 / 9.00
Beadless	ton	15.50 /16.00
Auto tire carcass	ton	10.00 /10.50
Black auto peelings	ton	18.50 /19.50
Solid		
Clean mixed truck	ton	38.50 /40.00
Light gravity	ton	42.00 /43.00
Mechanicals		
Mixed black scrap	ton	15.00 /17.00
Hose, air brake	ton	14.00 /15.00
Garden, rubber covered	ton	13.00 /13.50
Steam and water, soft	ton	13.00 /13.50
No. 1 red	lb.	.02 3/4/ .02 5/8
No. 2 red	lb.	.01 1/2/ .01 3/4
White druggists' sundries	lb.	.02 3/4/ .03
Mechanical	lb.	.02 / .02 1/2
Hard Rubber		
No. 1 hard rubber	lb.	.11 1/4/ .11 1/2

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	February, 1935				March, 1935																	
	25	26	27	28	1	2	4	5	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23
No. 1 Ribbed Smoked Sheet	13	12 5/8	12 5/8	12 5/8	12 5/8	12 5/8	12 5/8	12 1/16	11 13/16	12 1/16	12 1/16	11 13/16	11 5/8	11 7/16	11 3/8	11 7/16	11	11 1/16	10 5/8	10 7/8	11 1/16	10 5/8	10 5/8	10 5/8
No. 2 Ribbed Smoked Sheet	12 3/4	11 13/16	11 13/16	12	11 7/8	11 7/8	11 5/8	11 7/16	11 5/8	11 7/16	11 1/2	11 3/8	11 5/8	11	11 1/4	10 13/16	10 1/2	10 5/8	10 7/8	10 3/8	10 7/8	10 1/8	10 1/4	10 7/16
No. 3 Ribbed Smoked Sheet	12 7/8	11 3/4	11 3/4	11 13/16	11 3/4	11 3/4	11 1/2	11 5/8	11 5/8	11 1/4	11 7/16	11 1/4	11	10 7/8	11 1/8	10 13/16	10 3/8	10 1/2	10 11/16	10 1/4	10 1/4	10	10 1/8	10 1/8
No. 4 Ribbed Smoked Sheet	12 7/16	11 5/8	11 5/8	11 11/16	11 5/8	11 5/8	11 3/8	11 7/16	11	11 5/16	11 7/16	11 5/16	10 7/8	10 3/4	11	10 7/16	10 1/4	10 3/8	9 15/16	10 1/16	10 7/16	9 7/8	10	9 15/16
No. 1 Thin Latex Crepe	13 3/4	13	13	13	12 7/8	12 7/8	12 5/8	12 3/4	12 1/4	12 5/8	12 5/8	12 1/4	12	11 7/8	12 1/8	11 3/4	11 3/8	11 1/2	11	11 1/4	11 3/8	11	11	10 3/4
No. 1 Thick Latex Crepe	13 1/4	12 7/8	12 7/8	12 7/8	12 3/4	12 3/4	12 1/2	12 1/4	12 1/4	12 1/4	12 1/4	12 1/4	11 7/8	11 3/4	12	11 5/8	11 1/4	11 1/4	10 7/8	11 1/8	11 1/8	10 3/4	10 3/4	10 5/8
No. 1 Brown Crepe	11 3/4	10 7/8	11 1/8	11 1/8	11	11	10 3/4	10 5/8	10 7/16	10 5/8	10 11/16	10 5/8	10 3/8	10 1/4	10 1/2	10 1/4	10 1/8	10 7/16	9 11/16	10	10 1/8	9 3/4	9 3/4	9 5/8
No. 2 Brown Crepe	11	10 3/4	10 7/8	10 7/8	10 3/4	10 3/4	10 1/2	10 1/2	10 7/16	10 1/2	10 1/2	10 7/16	10 1/4	10 1/8	10 3/8	10 1/8	10	10 7/16	9 7/16	9 7/8	10	9 5/8	9 5/8	9 1/2
No. 2 Amber	11 7/16	10 7/8	11 1/8	11 1/8	11 1/8	11 1/8	10 11/16	10 7/8	10 7/16	10 5/8	10 11/16	10 5/8	10 3/8	10 1/4	10 1/2	10 1/4	10 1/8	10 7/16	9 11/16	10	10 1/8	9 3/4	9 3/4	9 5/8
No. 3 Amber	11 7/16	10 3/4	10 7/8	10 11/16	10 11/16	10 11/16	10 7/8	10 1/2	10 7/16	10 1/2	10 1/2	10 7/16	10 1/4	10 1/8	10 3/8	10 1/8	10	10 7/16	9 7/16	9 7/8	10	9 5/8	9 5/8	9 1/2
No. 4 Amber	10 5/8	10 3/8	10 1/2	10 7/16	10 7/16	10 7/16	10 1/4	10 1/4	10 1/8	10 1/4	10 1/4	10 1/8	10 1/16	10	10 1/16	10	9 7/8	9 11/16	9 3/8	9 5/8	9 11/16	9 1/2	9 1/2	9 3/8
Rolled Brown	10 1/2	10 1/4	10 3/8	10 7/16	10 7/16	10 7/16	10 1/8	10	10	10 1/8	10 1/8	10 7/16	10	9 7/8	10	9 7/8	9 7/8	9 7/8	9 1/4	9 1/2	9 3/4	9 3/8	9 1/4	9 1/4

COMPOUNDING INGREDIENTS

BUSINESS in compounding ingredients during March declined in volume as compared with January and February, but was fairly active for the general list, with special stress on accelerators, antioxidants, and other essential chemical ingredients.

Rubber goods production of tires, tubes, and footwear is reported fair, and in all other lines, better than fair and improving.

ACCELERATORS AND ANTIOXIDANTS. These essentials are moving steadily into consumption in all rubber manufactures.

Darvan, the recently introduced chemical for pigment dispersion purposes in latex compounding, has been altered and is now sold as dry powdered active material instead of in liquid solution form.

CARBON BLACK. The demand for carbon black by the tire and mechanical goods divisions continues in large and steady volume. Interest is centered on proposed legislation in Texas where a bill has been introduced to levy an excise tax on carbon black.

LITHARGE. Prices tend to gain strength with the improvement noted in demand.

LITHOPONE. Demand decreased in February, but shows at present a tendency to improve.

RUBBER SOLVENTS. A good demand has been maintained by the tire division, also by most of the other rubber manufacturing lines. Prices are very steady.

STEARIC ACID. Demand is fair and steady, and prices firmer than a month ago.

ZINC OXIDE. Improvement is noted in tire manufacturing demand. Prices are steady.

New York Quotations

March 25, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	$0.01¼/$0.03½
Rottenstone, domestic	lb.	.02½/ .05
English	ton	
Silica, 15	ton	
Tripoli	lb.	.02¼/ .03
Accelerators, Inorganic		
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.06 / .06¼
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½
Accelerators, Organic		
A-1	lb.	.21 / .25
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	
Accelerator 49	lb.	.40 / .50
87	lb.	
122	lb.	
552	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	.44 / .54
D.O.T.T.U.	lb.	
DPG	lb.	.35 / .45
Esterex	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.11
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
Pipsolene	lb.	
R-2	lb.	1.50 / 1.90
Base	lb.	4.55 / 5.00
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tepidone	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	$0.48 /$0.60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
Acids		
Acetic 28% (bbls.)	100 lbs.	2.40 / 2.65
glacial (carboys)	100 lbs.	14.00
Sulphuric, 66°	ton	15.50
Activator		
Barak	lb.	
Age Resisters		
Age-Rite Gel	lb.	
HP	lb.	
powder	lb.	
resin	lb.	
white	lb.	
Akroflex A	lb.	
B	lb.	
C	lb.	
Albasan	lb.	
Antox	lb.	
A-V-A-R	lb.	
B-L-E	lb.	
Flectol B	lb.	
H	lb.	
White	lb.	
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	
Parazone	lb.	
Permalux	lb.	
Solux	lb.	
V-G-B	lb.	
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60
Antiscorch Materials		
Antiscorch T	lb.	
Retarder B	lb.	
W	lb.	
R. H. Cumar	lb.	.085
U-T-B	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Binders, Fibrous		
Asbestos	ton	30.00
Brake Lining Saturants		
B. R. C. No. 553	lb.	.015 / .017
B. R. T. No. 3	lb.	.015 / .017
Colors		
BLACK		
Bone (Quality Group No. 1)	lb.	.11½/ .12
Lampblack (commercial)	lb.	.07 / .15
BLUE		
Brilliant	lb.	
Prussian	lb.	.36½
Toners	lb.	$0.80 /$3.50
Ultramarine, dry	lb.	.10
BROWN		
Mapico	lb.	.13
Sienna, Italian, raw (Quality Group No. 1)	lb.	.12½
GREEN		
Brilliant	lb.	
Chrome, light	lb.	.20
medium	lb.	.20
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48 / .60
Golden 15/17%	lb.	.28 / .30
7-A	lb.	.33
Z-2	lb.	.20
Cadmium	lb.	.75 / .80
Chinese	lb.	
Crimson	lb.	
Iron Oxides		
Rub-Er-Red	lb.	.09¼
Mapico	lb.	.09¼
Medium	lb.	
Scarlet	lb.	
Toners	lb.	.80 / 2.00
WHITE		
Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½/ .04¾
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
Sunolith (5-ton lots)	lb.	.04½/ .04¾
XX-20 Zinc Sulphide	lb.	.10½/ .10¾
86	lb.	.10½/ .10¾
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06 / .06¼
Titanox-A	lb.	.17 / .18¾
B	lb.	.06 / .06½
C	lb.	.06 / .06½
Ti-Tone	lb.	
Zinc Oxide		
Anaconda, Lead Free No. 352	lb.	.05¾/ .06
No. 570	lb.	.05¾/ .06
No. 577	lb.	.05¾/ .06
Green Seal No. 333	lb.	.09⅜/ .09⅝
Red Seal No. 222	lb.	.08⅜/ .08⅝
U.S.P. No. 777 (bbls.)	lb.	.12¾
White Seal No. 555	lb.	.10⅝
Azo ZZZ-11	lb.	.05¾/ .06
44	lb.	.05¾/ .06
55	lb.	.05¾/ .06
66	lb.	.05¾/ .06

New York Quotations

March 25, 1935

Prices Not Reported Will Be Supplied on Application

Zinc Oxide (*Cont'd*)
French Process, Florence
White Seal-7 (bbls.)..lb. $0.10⅝
Green Seal-8 .....lb. .09⅜/$0.09⅝
Red Seal-9 .....lb. .08⅜/ .08⅝
Kadox, Black Label-15....lb. .09⅜/ .09⅝
Blue Label-16 .....lb. .08⅜/ .08⅝
Red Label-17 .....lb. .07 / .07¼
Horse Head Special-3....lb. .05¾/ .06
XX Red-4 .....lb. .05¾/ .06
23 .....lb. .05¾/ .06
72 .....lb. .05¾/ .06
78 .....lb. .05¾/ .06
80 .....lb. .05¾/ .06
103 .....lb. .05¾/ .06
112 .....lb. .05¾/ .06
St. Joe (lead free)
Black Label No. 20 (bags) .....lb. .05¾
Green Label No. 42 (bags) .....lb. .05¾
Red Label No. 30 (bags) .....lb. .05¾
U.S.P. X (bbls.) .....lb. .12½

YELLOW
Cadmium .....lb. .40 / .45
Lemon .....lb.
Mapico .....lb. .09½
Ocher, domestic (Quality Group A) .....lb. .02¾
Toners .....lb. 2.50

Dispersing Agents
Bardex .....lb. .023 / .025
Bardol .....lb. .021 / .023
Darvan .....lb.

Factice—See Rubber Substitutes

Fillers, Inert
Asbestine, c.l., f.o.b. mills..ton 15.00
Barytes .....ton 30.00
f.o.b. E. St. Louis.....ton 25.00
off color, domestic.....ton 22.50 /25.00
white, imported .....ton 32.50 /35.00
Blanc fixe, dry precip.....ton 70.00 /75.00
pulp .....ton 42.50
Calcene .....ton 35.00 /45.00
Infusorial earth .....lb. .03 / .05
Kalite No. 1 .....ton
No. 3.....ton
Suprex, white, extra light.ton
heavy .....ton 45.00 /60.00
Whiting
Chalk precipitated .....lb. .04¼/ .04¾
Columbia brand .....ton 9.00 /14.00
Domestic .....100 lbs.
Hakuenka .....lb.
Paris white, English cliff-stone .....100 lbs.
Southwark Brand, Commercial .....100 lbs.
All other grades..100 lbs.
Sussex .....ton
Witco, c.l. .....ton 7.00
Wood flour (f.o.b. New Hampshire) .....ton 20.00 /50.00

Fillers for Pliability
Flex .....lb.
Fumonex, c.l., f.o.b works, bags .....lb. .03
l.c.l., f.o.b. warehouse...lb. .05½/ .07
P-33 .....lb.
Thermax .....lb.
Velvetex .....lb.

Finishes
IVCO lacquer, clear.....gal. 2.40 / 2.65
colors .....gal. 2.50 / 4.70
Rubber lacquer, clear.....gal.
colored .....gal.
No. 106.....gal. 3.00
Starch, corn, pwd.....100 lbs. 3.56 / 3.76
potato .....lb. .04½/ .05½
Talc, dusting .....ton 20.00
Pyrax .....ton

Flock
Cotton flock, dark.....lb. .10½/ .12
dyed .....lb. .50 / .80
white .....lb. .14½/ .20
Rayon flock, colored .....lb. 1.40 / 1.75
white .....lb. 1.10

Latex Compounding Ingredients
Antox, dispersed .....lb.
Aquarex D .....lb.
F .....lb.
Aresco .....lb. .28 / .40
Aresklene .....lb.
Casein, domestic (5-ton lots, delivered) .....lb. .13½/ .14
Catalpo .....ton
Color pastes, dispersed.....lb.
Dispersaid .....lb. 1.50
Emo, brown .....lb. .13
white .....lb. .13
Factice Compound, dispersed .....lb. $0.36
Heliozone, dispersed .....lb.
Igepon A .....lb.
Nekal BX (dry).....lb.
Palmol .....lb. .10
Sulphur, colloidal .....lb.
Vulcan colors .....lb.
Zinc oxide, colloidal.....lb.

Mineral Rubber
B. R. C. No. 20.....lb. .0125/$0.014
Black Diamond, c.l. .....ton 25.00
Genasco Hydrocarbon, granulated, (fact'y)...ton 30.00
solid .....ton 25.00
Gilsonite Hydrocarbon (factory) .....ton
Hydrocarbon, hard .....ton
soft .....ton
Parmr Grade 1 .....ton 25.00 /28.00
Grade 2 .....ton 25.00 /28.00
265° .....ton

Mold Lubricants
Mold Paste No. 1.....lb.
Rusco mold paste .....lb. .12 / .30
Sericite .....ton 65.00 /70.00
Soapbark (cut) .....lb. .10 / .11
Soapstone .....ton 15.00 /25.00

Oils
Castor, blown, c.l., drums, returnable .....lb. .11½
Poppyseed (bbls.).....gal.
Rapeseed, refined (bbls.)..gal. .49

Reclaiming Oils
B. R. V.....lb. .039 / .041
S. R. O.....lb. .012 / .014

Reenforcers
Carbon Black
Aerfloted Arrow Specification Black .....lb. .0535/ .0825
Arrow Compact Black...lb.
Granulized Carbon Black .....lb.
Century (delivered).....lb. .0445/ .0535
"Certified" Cabot .....lb.
Spheron .....lb.
Disperso (delivered).....lb. .0445/ .0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.....lb. .0445
c.l., delivered New York.lb. .0535
local stock, delivered..lb. .07 / .08¼
Dixiedensed, c.l. f.o.b. New Orleans, La., Galveston or Houston, Tex.....lb. .0445
c.l., delivered New York.lb. .0535
local stock, delivered..lb. .07 / .08¼
Excello, c.l., f.o.b. Gulf ports .....lb. .0445
delivered New York.lb. .0535
l.c.l., delivered New York .....lb. .07 / .08¼
Gastex .....lb. .03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.lb. .0445
c.l., delivered New York.lb. .0535
local stock, delivered..lb. .07 / .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.lb. .0445
c.l., delivered New York.lb. .0535
local stock, delivered..lb. .07 / .08¼
Micronex Beads.....lb.
Mark II .....lb.
Standard .....lb.
W-5 .....lb.
W-6 .....lb.
Ordinary (compressed or uncompressed) .....lb. .0535
Supreme, c.l., f.o.b Gulf ports .....lb. .0445
delivered New York.lb. .0535
l.c.l., delivered New York .....lb. .07 / .08¼
Carbonex .....lb. .030 / .0375
Carbonex "S" .....lb. .0315/ .040
Clays
Aerfloted Paragon .....ton 8.50
Suprex No. 1 Selected.ton 10.00
No. 2 Standard....ton 8.50
Blue Ridge, dark.....ton
China .....ton
Dixie .....ton
Junior .....ton
McNamee .....ton
Par .....ton
Perfection .....ton
Standard .....ton
Witco .....ton 8.50
Cumar EX .....lb. .04

Reodorants
Amora A .....lb.
B .....lb.
C .....lb.
D .....lb.
Para-Dors .....lb.
Rodo No. 0.....lb.
No. 10 .....lb.

Rubber Substitutes or Factice
Amberex .....lb. $0.13¾
Black .....lb. .07 /$0.11
Brown .....lb. .08½/ .12
Duphax A .....lb. .095
B .....lb. .095
Fac-Cel B .....lb. .12
C .....lb. .12
White .....lb. .08½/ .12

Softeners
B. R. C. No. 555.....lb. .012 / .014
B. R. T. No. 7.....lb. .015 / .017
Burgundy pitch .....lb. .04 / .05
(net weight) .....lb. .07 / .08½
Corn oil, crude (bbls.).....lb. .12
Cycline oil .....gal. .15 / .28
Genasco liquid asphalt....gal. .07
Palm oil (Witco).....lb. .06
Petrolatum, light amber...lb. .03¾
Pigmentar (drums) .....gal. .25 / .27
Pigmentaroil (drums) ...gal. .25 / .27
Pine oil, dest. distilled (drums) .....gal. .44 / .48
pitch .....bbl. 6.00
tar (drums) .....gal. .25 / .27
retort .....gal. .33
Plastogen .....lb.
Reogen .....lb.
Rosin oil, compounded....gal. .37 / .41
Rubtack .....lb. .10
Tackol .....lb. .085 / .18
Tonox .....lb.
Powder .....lb.
Witco No. 20.....gal. .15

Softeners for Hard Rubber Compounding
RSL Resin .....lb.
Resin C-55° .....lb. .0125/ .0145
Resin C-70° .....lb. .0125/ .0145
Resin C-85° .....lb. .0125/ .0145

Solvents
Benzol 90% (drums).....gal. .25
Beta-Trichlorethane .....gal.
Bondogen .....gal.
Carbon bisulphide (drums).lb. .05¼/ .08½
tetrachloride .....lb. .05¼
Dipentene, commercial (drums) .....gal. .42 / .44
Rubber (f.o.b. Group 3 refineries) .....gal.
Solvesso No. 1, tank cars.gal. .17½
No. 2 .....gal. .22½
No. 3 .....gal. .17½
No. 4 .....gal. .22½
Toluol .....gal. .38
Turpentine, steam distilled .....gal. .53
wood, dest. distilled (drums) .....gal. .41 / .43

Stabilizers for Cure
Laurex, ton lots .....lb.
Stearex B .....lb. .11 / .13
Beads .....lb. .09 / .11
Stearic acid, dbl. pres'd....lb. .12 / .14
single pressed .....lb. .11 / .13
Stearite .....lb. .08
Zinc stearate .....lb. .22 / .25

Synthetic Rubber
DuPrene Latex Type 50..gal.
Type D .....lb.

Tackifier
B. R. H. No. 2.....lb. .015 / .017

Varnish
Shoe .....gal. 1.45

Vulcanizing Ingredients
Sulphur
Chloride, drums .....lb. .03½/ .04
Flowers, extrafine refined, U.S.P. ...100 lbs.
Rubber .....100 lbs. 1.95 / 2.80
Telloy .....lb.
Vandex .....lb.
(See also Colors—Antimony)

Waxes
Carnauba, No. 3 chalky....lb. .27 / .28
2 N.C. .....lb. .30 / .31
3 N.C. .....lb. .28 / .29
1 Yellow .....lb. .38 / .39
2 .....lb. .37 / .38
Montan, crude .....lb. .11
Paraffine (128/130) refined.lb. .06

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for February totaled 43,187 long tons, against 47,103 long tons for January. February consumption decreased 8.31% under January and 6.4% over February, 1934, according to R.M.A. statistics. Consumption for February, 1934, was 40,609 long tons.

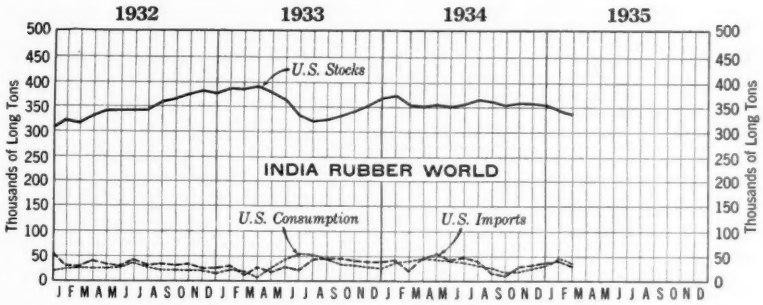
Crude rubber imports for February were 35,383 long tons, a decrease of 15.9% below the January figure of 42,059 long tons, but 14.0% above the 31,032 long tons imported in February, 1934.

The estimated total domestic stocks of crude rubber on hand February 28 were 337,332 long tons, which compares with January 31 stocks of 346,084 long tons and 358,681 long tons on hand February 28, 1934.

Crude rubber afloat for United States ports February 28 was 42,969 long tons, compared with 42,066 long tons afloat January 31 and 53,063 long tons afloat February 28, 1934.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
Mar. 2	88,097	68,266
Mar. 9	89,388	68,963
Mar. 16	91,153	69,440
Mar. 23	91,298	69,616


1932
1933
1934
1935
U.S. Stocks
INDIA RUBBER WORLD
U.S. Consumption
U.S. Imports
Thousands of Long Tons
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

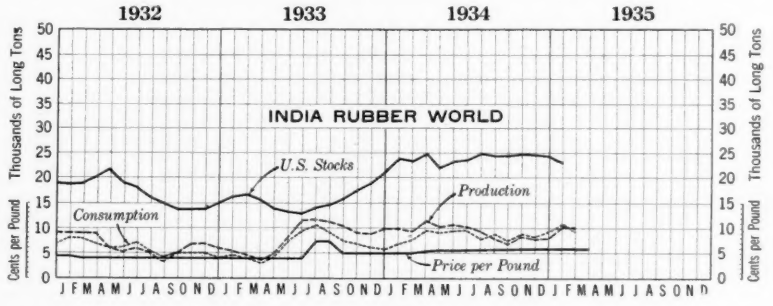
Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang, Etc., Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1931	495,163	348,986	322,825	40,455	127,103	55,458	797,441	668,660	495,724
1932	400,787	332,000	379,000	38,360	92,567	36,802	709,840	670,250	518,187
1933	411,615	401,000	365,000	55,606	86,438	48,744	845,291	818,370	489,029
1934	469,484	454,350	352,632	47,644	134,790	67,899	1,013,442	927,000	555,321
1935									
January	42,059	47,103	346,084	42,066	148,212	64,862	74,321	83,700	559,158
February	35,383	43,187	337,332	42,969	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule. †Stocks on hand the last of the month or year. ‡W. H. Rickinson & Son's figures. §Stocks at the 3 main centers, U. S. A., U. K., Singapore and Penang.

RECLAIMED RUBBER

PRODUCTION of reclaim thus far in the first quarter is running slightly above 10,000 tons. In February consumption dropped 2,000 tons below the January rate, but the average of production and of consumption for January and February balance within 100 tons. Business in reclaim thus far this year has been good, and the outlook is encouraging for the active demand to continue well into the spring months.

Prices on all grades are quoted unchanged from last month. The fact that the standard grades hold so steadily at low volume cost gives them pronounced value as stabilizers of price, as well as technical quality, particularly when it is considered that they can be purchased for delivery for future needs at the present nominal quotations.


1932
1933
1934
1935
INDIA RUBBER WORLD
U.S. Stocks
Production
Consumption
Price per Pound
Thousands of Long Tons
Cents per Pound
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1931	132,462	125,001	35.7	19,257	6,971
1932	75,656	77,500	23.3	21,714	3,536
1933	99,974	81,612	20.1	20,746	3,583
1934	110,010	100,597	22.3	23,079	4,737
1935					
January	10,465	11,261	23.9	22,291	517
February	10,072	9,374	21.7	22,989	....

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

New York Quotations

March 25, 1935

	Spec. Grav.	Cents per lb.
High Tensile		
Super-reclaim, black	1.20	8¾/9
red	1.20	7 /7¼
Auto Tire		
Black	1.21	5 /5¼
Black selected tires	1.18	5¼/5½
Dark gray	1.35	6¼/6¼
White	1.40	9¼/9½
Shoe		
Unwashed	1.60	6½/6¾
Washed	1.50	8 /9
Tube		
No. 1	1.00	13 /
No. 2	1.10	7½/7¾
Truck Tire		
Truck tire, heavy gravity	1.55	5¾/6
Truck tire, light gravity	1.40	6 /6¼
Miscellaneous		
Mechanical blends	1.60	4¼/4½

Cia Brasiliera de Artefactos de Borracha, Rio de Janeiro, Brazil, has recently installed tire building machinery for 600 tires daily in a newly erected building. Initial production, however, will be only 200 a day.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Feb. 2	Mar. 2	Mar. 9	Mar. 16	Mar. 23
Feb.	12.16	.....	.....	.....	.....
Mar.	12.22	12.34	12.02	10.84	.....
Apr.	.....	12.39	12.07	10.87	10.80
July	12.30	12.52	12.19	10.96	10.94
Sept.	12.22	12.49	12.02	10.63	10.68
Dec.	12.27	12.54	11.98	10.55	10.69
Jan.	.....	12.57	12.03	10.60	10.70

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of this review. This plan permits tracing at a glance the prices of representative futures for approximately two consecutive months.

Week ended March 2. Cotton middlings trading proceeded during this period at a fairly active rate largely by professional interests changing their long or short interests from near to more distant delivery months. Speculation that the Government monetary program would lead to further inflation and that the 6,000,000 bales of pool cotton would be impounded and thereby withdrawn from the physical market for 1½ years furnished bull trends that were alternated with bearish tendencies born of doubt as to whether the 1935 crop would be pegged by the 12¢ loan policy and whether or not policies would be adopted assuring the usual American cotton export position. Fluctuations occurred through a relatively narrow price range, closing the period with gains of 12 to 27 points the distant months leading: September, for instance, 12.49¢ against 12.22 the previous week.

Week ended March 9. Trading and news were dull until the last day of this period. Prices accordingly fluctuated through a narrow range with a downward trend. Heavy liquidation occurred the last day because of nervousness caused by press dispatches from Washington apparently giving impressions of the Government's indecision as to what policy to adopt. Prices slumped 16 to 26 points for the day, thus closing the week with recessions of 32 to 54 points.

Week ended March 16. A break occurred on the opening day of this period of proportions that taxed the 200-point limitation rule to check. The past seven or eight months of Government price pegging had caused all traders to take a long position. Rumors that the 12¢ loan policy would be abolished, that large production amounts of 1935 crop would be tax free, and that foreign spinners are satified with foreign cottons, all combined to crystallize the opinion that the entire Government cotton program was meeting with failure. All holders tried to sell; stop orders were uncovered; below the market buying orders were canceled.

The Journal of Commerce described the exchange condition by saying, "The exchange turned from a market into a route."

Prices plunged through the 12¢ and then the 11¢ levels with no regard for the pegged price. Domestic and foreign buying at the low levels created something of a rally late in the day, causing near months to close above 11¢. Nervousness and acute fluctuations marked the entire week, which closed with losses of 118 to 143 points, all deliveries being below 11¢; April, for instance, 10.87¢, a loss of 120 points. Consideration was given to closing the exchange, but abandoned. Senator Smith of South Carolina asked the Senate to approve a $25,000 fund to investigate the reasons for the break. The Government 1935 crop policy remained just as indefinite as it has been for the past several months.

Week ended March 23. New lows were established in the cotton futures market, at the outset of this period, by another severe break that carried prices down 44 to 63 points from the previous close and that rallied but slightly to close the first day of this week 43 to 58 points off. Heavy foreign selling of July and later contracts with unusually heavy selling by a foreign house, which was rumored to transact business for the Government pool seemed to lead the bearish drive. Oscar Johnson, manager of the Government cotton pool, is reported to be in England, where he stated, according to *The Journal of Commerce,* that our Government holds 250,000 bales of long futures and 1,350,000 bales of actual cotton. *The Journal* obtained a statement from Washington denying that pool cotton had been sold through Liverpool operators. Attention at Washington is reported to be centering on proposals for changes in the cotton exchange trading rules rather than Senator Smith's plan to investigate the cause of the recent breaks. A substantial rally followed, bringing a recovery of about ¾ of the previous day's losses. Bullish news was supplied by the endorsement of southern states senators in a meeting at Washington of a cut in the Bankhead allotment to 10,000,000 bales from 10,500,000, continuation of the 12¢ loan, abolishment of the processing tax in favor of subsidizing agricultural exports including cotton textiles by using 30% of customs receipts. Fluctuations were rather wide with alternate bullish and bearish innings during the remainder of the hectic week which closed 7 points loss to 13 points gain as against the previous week's close. The House of Representatives' favorable action on the Patman bonus bill favoring a $2,000,000,000 inflation of currency overcame the trade's discouragement at Washington's procrastination concerning the 1935 policy sufficiently to offset the heavy losses of the early part of the week.

On March 25 uncertainty over the fate of an amendment in the United States Senate to the relief bill giving the President power to suspend all processing taxes favorably influenced the cotton market, and nearby positions rose $1.50

(*Continued on page* 84)

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Mar. 2	12.58
Mar. 9	12.48
Mar. 16	11.37
Mar. 23	11.03

New York Quotations

March 25, 1935

Drills		
38-inch 2.00-yard	*yd.*	$0.15¼
40-inch 3.47-yard		.09⅛
50-inch 1.52-yard		.21¾
52-inch 1.85-yard		.17⅞
52-inch 1.90-yard		.16
52-inch 2.20-yard		.14½
52-inch 2.50-yard		.13
59-inch 1.85-yard		.16½
Ducks		
38-inch 2.00-yard D. F.	*yd.*	.15 /.15½
40-inch 1.45-yard S. F.		.21⅜
51½-inch 1.35-yard D. F.		.21½
72-inch 1.05-yard D. F.		.29½/.29⅝
72-inch 17.21-ounce		.33⅜
MECHANICALS		
Hose and belting	*lb.*	.33½
TENNIS		
52-inch 1.35-yard	*yd.*	.23
***Hollands**		
GOLD SEAL		
30-inch No. 72	*yd.*	.19½
40-inch No. 72		.20½
RED SEAL		
30-inch	*yd.*	.17
40-inch		.18
50-inch		.23¼
Osnaburgs		
40-inch 2.34-yard	*yd.*	.11⅞/.13⅛
40-inch 2.48-yard		.11¼/.12⅝
40-inch 2.56-yard		.10¾
40-inch 3.00-yard		.10⅜
40-inch 7-ounce part waste		.11
40-inch 10-ounce part waste		.16¼
37-inch 2.42-yard		.12⅞
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	*yd.*	.08¾
Plaids 60 x 48		.07¾
Surface prints 60 x 64		.12¼
Print cloth, 38½-inch, 60 x 64		.06⅛
SHEETINGS, 40-INCH		
48 x 48, 2.50-yard	*yd.*	.10¾
64 x 68, 3.15-yard		.09¾
56 x 60, 3.60-yard		.08¼
44 x 48, 3.75-yard		.06⅝
SHEETINGS, 36-INCH		
48 x 48, 5.00-yard	*yd.*	.05¾
44 x 40, 6.15-yard		.04⅞
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	*lb.*	.37½
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	*lb.*	.37½
9¾ ounce 60" 10/2 ply Karded peeler	*lb.*	.37½
CORD FABRICS		
23/5/3 Karded peeler, 1 1/16" cotton	*lb.*	.37½
15/3/3 Karded peeler, 1 1/16" cotton	*lb.*	.35½
23/5/3 Karded peeler, 1¼" cotton	*lb.*	.44½
23/5/3 Combed Egyptian	*lb.*	.51½
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	*lb.*	.32½

*For less than 1,000 yards of a width add 10% to given prices.

The Wellman Company

Manufacturers of

THE PATTEN SOLE CUTTING MACHINE

FOR CUTTING SOLES AND TAPS FROM SHEET STOCK AT ANY BEVEL FROM 27° TO 90°.

THESE MACHINES HAVE A CAPACITY MANY TIMES IN EXCESS OF HAND CUTTING. MANUFACTURED OF THE BEST MATERIALS AND WORKMANSHIP BUT LITTLE ATTENTION IS NECESSARY TO KEEP THEM IN SERVICEABLE CONDITION. THE SOLES CUT ARE OF SUCH STANDARD BEVEL AS MAY BE DESIRED AND POSSESS A SMOOTH AND ATTRACTIVE EDGE ADDING MUCH TO THE APPEARANCE OF THE FINISHED SHOE.

Wellman Company

Manufacturers of Rubber Sole Cutting Machinery

MEDFORD, MASS.

MT. VERNON WOODBERRY MILLS, INC.

TURNER, HALSEY CO.

SALES AGENT

40 WORTH ST., NEW YORK

BALTIMORE BOSTON — BRANCHES CHICAGO NEW ORLEANS — SAN FRANCISCO ST. LOUIS

Regular and Special Constructions of

COTTON FABRICS

Single Filling Double Filling and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

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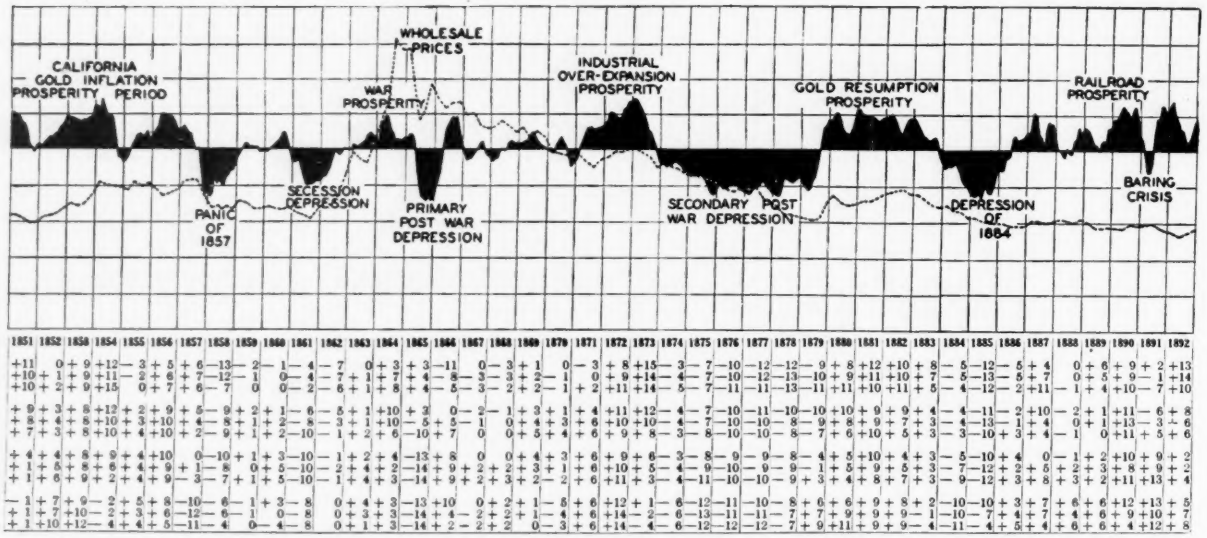
American Busines Ac



THE index is composed of one set of ten series of annual data from 1790 to 1855, and of another set of ten series of annual data from 1855 to 1901. The fluctuations above and below normal were computed for each series separately, and the ten were then combined in one. Normal values for each series were means between one set of lines running from one prosperity peak to the next, and another similar set of lines running from each depression bottom to the next. The annual figures from 1901 to 1919 are those of the Thomas index of manufacturing production with mineral production added, and from 1919 to date the monthly figures of the Federal Reserve (Thomas) index of industrial production have been used. All the data were reduced to a per capita basis.

The computations of the fluctuations of each of the ten series constituting the index from 1855 to 1901 were carried through to include 1930, and the coefficient of correlation between each of them and the production series running from 1901 through 1930 was computed. Their deviations were then multiplied through by constants so as to equate their amplitudes of cyclical fluctuation. Each of the ten series was then given a weight based on its degree of correlation with the production series, and with these weightings they were combined into a single index. The ten series with these weights are pig iron consumption 15, railroad freight ton miles 15, cotton consumption 14, canal freight (New York and Sault Ste. Marie) 12, coal production 12, construction of miles of new railroads 12, blast furnace activity 10, rail production 6, locomotive production 2, and ship construction 2. The ten series combined give results closely similar to those of the production series for the overlap period from 1901 through 1930. The heights of prosperities and the depths of depressions are closely alike in the two series. The coefficient of correlation for the period is .95. Their average deviations are equal.

In a similar way the computations of the fluctuations of each of the ten series constituting the index from 1790 to 1855 were carried through to include 1882, and the coefficient of correlation between each of them and the first twenty-eight years of the index running from 1855 to 1901 was computed. Their deviations were then multiplied through by constants so as to equate their amplitudes of cyclical fluctuation. Each of the ten series was then given a weight based on its degree of correlation with the first twenty-eight years of the index from 1855 to 1901, and with these weightings they were combined into a single index. The ten series with these weights are commodity prices 20, imports 18, imports retained for consumption 16, government receipts 14, ship construction 12, government expenditures 6, coal production 6, exports 5, iron exports 2, and tons of registered shipping in service one. The ten series combined give results closely similar to those of the other index for the overlap period from 1855 through 1882. The heights of prosperities and the depths of depressions are closely alike in the two series. The coefficient of correlation for the period is .90. Their average deviations for the period are equal.

When the annual data were determined, the monthly data were fitted to them. These monthly data were based on the figures of the business index of the American Telephone & Telegraph Co. and on data for blast furnace activity from 1877 to 1919. Monthly data for bank clearings and for stock prices were used from 1861 to 1877, and those for security and commodity prices from 1815 to 1861. From 1790 to 1815 the monthly data are based on commodity prices.

The dashed line represents the changes in wholesale commodity prices. The index used is that of Professors Warren and Pearson (Cornell), recomputed so that the average for 1929 equals 100. This series was used from 1798 to date. From 1795 to 1798 the Smith series was used, and from 1790 to 1795 a British price index was used. *Cleveland Trust Co.*, Cleveland, O.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for February, 1935:

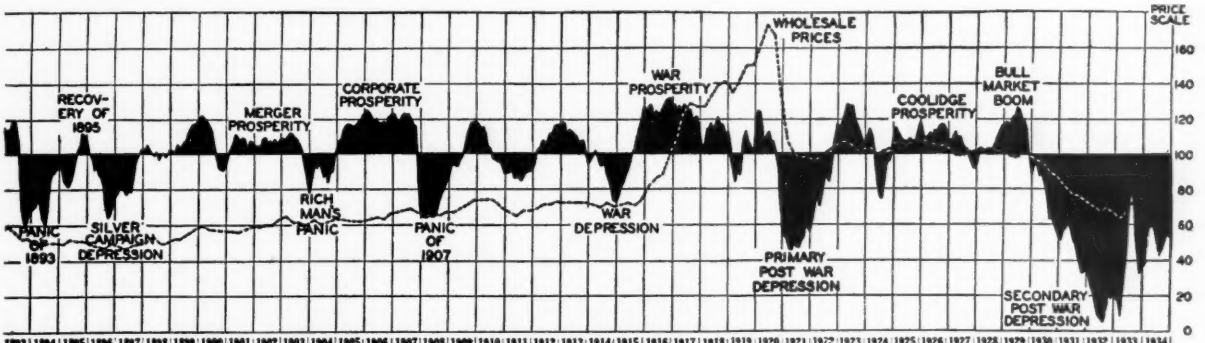
Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

	February, 1935	
To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	9,329	84
United States	26,573	657
Continent of Europe	6,694	194
British possessions	2,337	34
Japan	4,231	6
Other countries	444	12
Totals	49,608	987

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	1,816	6,504
Dutch Borneo	2,080	2,093
Java and other Dutch islands	85	1
Sarawak	1,752	135
British Borneo	428	19
Burma	263	4
Siam	1,487	801
French Indo-China	37	56
Other countries	111	4
Totals	8,059	9,617

ines Activity Since 1851



	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	
Jan.	+ 8	−15	− 4	0	−11	+ 1	+ 1	+11	0	+ 2	+ 4	− 7	+ 3	+13	+12	−18	− 3	+ 9	− 6	− 3	+ 9	− 1	−12	+12	+14	+ 2	0	+12	−23	−19	+ 7	+ 5	+ 8	+ 6	+ 4	+ 1	+10	− 4	−25	−35	−41		Jan.
Feb.	+ 7	−15	− 8	− 2	−10	+ 3	0	+11	+ 2	+ 2	+ 4	− 4	+ 4	+12	+ 9	−17	− 3	+ 7	− 5	+ 1	+ 9	− 1	− 9	+14	+13	+ 3	− 4	+12	−24	−15	+ 8	+ 7	+ 6	+ 5	+ 5	+ 2	+ 8	− 3	−22	−37	−43		Feb.
Mar.	+ 7	−13	− 9	− 5	−10	+ 1	+ 3	+10	+ 3	+ 2	+ 5	− 4	+ 7	+10	+ 9	−17	− 3	+ 8	− 4	+ 1	+ 5	+ 1	− 8	+14	+14	+ 7	− 8	+ 9	−27	−11	+11	+ 5	+ 5	+ 5	+ 6	+ 2	+ 8	− 6	−21	−39	−45		Mar.
Apr.	+10	−14	− 9	− 4	−10	0	+ 2	+ 9	+ 5	+ 4	+ 6	− 2	+ 8	+ 9	+11	−17	− 4	+ 6	− 7	+ 3	+ 7	− 1	− 6	+13	+13	+ 8	− 5	+ 3	−27	−15	+14	− 1	+ 4	+ 6	+ 4	+ 1	+11	− 5	−20	−43	−40		Apr.
May	+10	−12	− 8	− 6	−12	− 1	+ 2	+ 8	+ 5	+ 5	+ 6	− 4	+ 9	+10	+12	−18	− 2	+ 7	− 4	+ 6	+ 4	− 5	− 5	+14	+14	+ 9	− 6	+ 5	−25	−11	+14	− 7	+ 4	+ 5	+ 5	+ 1	+11	− 7	−21	−45	−29		May
June	+ 4	−20	− 5	− 7	−10	+ 1	+ 4	+ 7	+ 4	+ 3	+ 5	− 7	+ 9	+ 9	+11	−17	− 1	+ 2	− 7	+ 3	+ 6	− 3	− 1	+14	+13	+ 7	0	+ 6	−26	− 6	+14	−12	+ 3	+ 7	+ 3	+ 1	+14	−11	−25	−46	−16		June
July	− 6	−15	− 2	− 9	−11	− 2	+ 4	+ 1	+ 4	+ 4	+ 4	− 5	+ 8	+ 9	+11	−16	+ 2	− 1	− 8	+ 5	+ 5	− 3	0	+11	+12	+ 9	+ 4	+ 4	−26	− 7	+11	−13	+ 4	+ 6	+ 2	+ 2	+13	−15	−25	−47	− 9		July
Aug.	−16	− 8	0	−15	− 7	0	+ 8	− 1	+ 4	+ 3	+ 2	− 8	+ 8	+ 9	+10	−13	+ 4	− 2	− 6	+ 6	+ 3	− 6	+ 1	+13	+13	+11	+ 7	+ 4	−24	− 8	+10	− 8	+ 4	+ 8	+ 1	+ 2	+10	−18	−29	−45	−17		Aug.
Sept.	−20	− 6	+ 3	−18	− 2	0	+ 8	− 4	+ 1	+ 4	+ 1	− 5	+10	+ 8	+ 8	−11	+ 7	− 2	− 5	+ 6	+ 4	− 7	+ 5	+14	+ 9	+ 9	+ 4	0	−23	− 4	+ 6	− 3	+ 2	+ 9	− 1	+ 5	+10	−18	−31	−40	−24		Sept.
Oct.	−19	− 5	+ 6	−17	− 1	− 1	+ 9	− 5	+ 4	+ 3	− 4	− 5	+ 9	+11	+ 8	−10	+ 9	− 3	− 5	+ 8	+ 4	−10	+ 7	+16	+11	+ 9	+ 2	− 4	−20	+ 2	+ 5	− 2	+ 4	+ 9	− 3	+ 7	+ 7	−20	−34	−39	−30		Oct.
Nov.	−17	− 4	+ 5	−15	0	0	+ 9	− 5	+ 3	+ 3	− 8	− 1	+11	+11	− 8	− 8	+ 9	− 4	− 5	+ 8	− 1	−14	+10	+16	+11	+ 6	+ 1	−12	−20	+ 6	+ 4	0	+ 7	+ 7	− 4	+ 8	0	−22	−34	−41	−34		Nov.
Dec.	−16	− 4	+ 5	−12	+ 1	+ 1	+10	− 3	+ 3	+ 5	−11	+ 1	+12	+12	−17	− 7	+ 9	− 6	− 5	+ 8	− 3	−14	+13	+14	+ 6	+ 6	+ 2	−17	−22	+ 9	+ 3	+ 4	+ 9	+ 4	− 3	+ 9	− 6	−24	−33	−40	−33		Dec.

Tire Production Statistics

	Pneumatic Casings—All Types		
	Inventory	Production	Total Shipments
1932	6,115,487	32,067,732	32,200,820
1933	7,110,456	36,243,384	35,274,970
1934	9,171,335	45,815,763	45,285,955
1935			
Jan.	10,085,737	4,487,679	3,552,737
	Solid and Cushion Tires		
1932	23,830	97,089	108,581
1933	26,271	130,987	126,990
1934	34,710	197,497	187,152
1935			
Jan.	31,581	21,510	20,300
	Inner Tubes—All Types		
1932	5,399,551	29,513,246	30,328,536
1933	6,251,941	34,044,689	33,112,472
1934	8,904,496	44,840,971	43,694,130
1935			
Jan.	9,332,489	4,131,004	3,610,371

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%)
	Cotton Fabric Pounds	Crude Rubber Pounds	Gallons
1932	128,981,222	416,577,533	15,703,800,000
1933	148,989,293	512,489,423	15,880,746,000
1934	196,069,495	697,558,218	17,063,298,000
1935			
Jan.	19,607,932	72,968,356	1,178,604,000

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 80% for previous years, with the exception of gasoline consumption.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1726	Manufacturer of dental gum.
1727	Who can apply rubber to steel by an electrolysis process.
1728	Manufacturer of pimpled rubber.
1729	Manufacturer of small eraser that slips over end of pencil.
1730	Manufacturer of rubber bridle rein hand parts.
1731	Manufacturer of a small rubber button having molded in it a small hollow rivet.
1732	Manufacturer of swimming tubes.

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934		
Jan.	2,521,961	$239,054
Feb.	1,983,210	193,732
Mar.	2,539,425	257,545
Apr.	2,988,131	321,390
May	3,151,740	368,642
June	3,266,318	421,317
July	2,757,167	385,733
Aug.	2,617,829	369,335
Sept.	2,097,385	312,967
Oct.	2,065,490	282,503
Nov.	1,986,245	296,447
Dec.	1,301,233	184,588
1935		
Jan.	1,898,962	287,583

Data from United States Department of Commerce, Washington, D. C.

U. S. Crude and Waste Rubber Imports for 1935

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals 1935	Totals 1934	Balata	Miscellaneous	Waste
Jan. ....tons	41,188	599	201	30	41	..	..	42,059	46,204	26	553	..
Feb.	33,722	388	1,208	14	51	..	..	35,383	31,032	73	194	29
Total, 2 mos., 1935....tons	74,910	987	1,409	44	92	..	..	77,442	.....	99	747	29
Total, 2 mos., 1934....tons	75,152	1,723	300	61	..	..	..	.....	77,236	143	1,300	32

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Passenger Car Tire Sizes

Make and Model	Tire Size (Ins.)	Recommended Pressure (Lbs.)
Auburn 653	5.50/17	35
Auburn 851	6.50/16	28
Austin	3.75/18	..
Buick 35-40	6.25/16	26
Buick 35-50	7.00/16	26
Buick 35-60	7.50/16	24
Buick 35-90	7.50/16	28
Cadillac 355-D	7.00/17	35
Cadillac 370-D	7.50/17	35
Cadillac 452-D	7.50/17	35
Chevrolet .....Std.	5.25/17	32
Chevrolet .....Master	5.50/17	28
Chrysler .....Airstream 6	6.25/16	28
Chrysler .....Airstream 8	6.50/16	28
Chrysler .....Airflow 8	7.00/16	28
Chrysler ....Airflow Imp. 8	7.50/16	28
Chrysler ....Airflow I. C. 8	7.50/17	28
Chrysler ....Airflow I. C. 8	7.50/16	28
De Soto .....Airstream 6	6.25/16	28
De Soto .....Airflow 6	6.50/16	28
Dodge .....Six	6.00/16	28
Duesenberg .....J	7.00/19	..
Ford 8	6.00/16	30
Graham .....Std. 6-74	5.25/17	..
Graham .....Spec. 6-73	6.00/17	28
Graham 8-72	6.50/16	28
Graham .....Super 8-75	7.00/16	28
Hudson .....Big 6	6.00/16	22†
Hudson Spec., De L. & Cus. 8	6.50/16	22†
Hupmobile 518	6.00/18	24†
Hupmobile 521	6.50/16	22†
Hupmobile 527	7.00/16	22†
La Fayette 3510	6.00/16	30
La Salle 50	7.00/16	25
Lincoln V12-136	7.50/17	40
Lincoln V12-145	7.50/17	40
Nash .....Advanced 6	6.25/16	30
Nash .....Advanced 8	6.50/16	28
Oldsmobile F-35	6.25/16	25†
Oldsmobile L-35	7.00/16	25†
Packard 120	7.00/16	23†
Packard 8	7.00/17	35
Packard .....Super 8	7.00/17	35
Packard .....Twelve	7.50/17	35
Pierce-Arrow 845	7.00/17	40
Pierce-Arrow 1245-1255	7.50/17	40
Plymouth .....Six	6.00/16	28
Pontiac .....Std. 6	.....	..
Pontiac .....De L. 6	6.00/16	25†
Pontiac 8	6.50/16	25†
Reo 6A	6.25/16	28
Reo S7	6.50/16	22†
Studebaker .....Dict. 6	6.00/16	30
Studebaker.....Com. 8	6.50/16	30
Studebaker.....Pres. 8	7.00/16	30
Stutz SV-16	7.00/18	40†
Stutz DV-32	7.00/18	40†
Terraplane...Spec. & De L.	6.00/16	22†
Willys 77	5.00/17	30

†—Front only. From *Automotive Industries.*

Editor's Book Table

NEW PUBLICATIONS

"Seven Years with Gastex Carbon Black—1928-1934." General Atlas Carbon Co., 60 Wall St., New York, N. Y. The rubber chemist and technologist will find this booklet a thoroughly interesting treatise on the properties, uses, and advantages of Gastex as a distinctive form of carbon black. Extended reference is made to its popularity as a compounding ingredient in stocks for mechanical goods for all purposes, waterproof footwear, reclaim, wire insulation, transportation rubber including tires, etc.

"Just Tires in 1910 (beg your pardon, the horn bulb, too). Today—over 100 Rubber Parts." This attractive four-page folder by General Atlas Carbon Co., 60 Wall St., New York, N. Y., shows a 1910 auto on the front page and a 1935 De Luxe model on the inside, where Carbon Joe calls attention to the high qualities of Gastex carbon black and its importance in the rubber parts used in the car of today.

"Servus Canvas Rubber-Soled Shoes. America's Play Shoes, 1935." Servus Rubber Co., Rock Island, Ill. This attractive twelve-page catalog describes and illustrates in color the full line of Servus canvas rubber-soled footwear designed for a wide variety of sports for men, women, and children.

"A Glossary of Terms for Rubber Manufacturers." The Stamford Rubber Supply Co., Stamford, Conn. In this pamphlet of 27 pages are cataloged and explained about 125 terms relating to rubber, its uses and manufacture, embodying the advantages to be gained by the use of factice. This compilation will be found distinctly helpful by the practical rubber worker.

"Tyre Machinery." Francis Shaw & Co., Ltd., Corbett St. Ironworks, Manchester 11, England. This catalog is released by an old-established (1879) machinery concern, which during the past fifteen years has been the only engineering firm in Europe to concentrate on the supply of completely equipped factories for tire building. The machinery line comprises mills, calenders, and a great variety of tire building machines and accessory equipment, tire fabric bias cutters, tubing machines, watchcase vulcanizers, hydraulic autoclave presses, temperature and time cycle control, as well as special machinery for the manufacture of all classes of rubber goods. All of this equipment is clearly illustrated and briefly described in English, French, and German. Every rubber engineer should keep a copy on file for reference.

"Brown Instruments." The Brown Instrument Co., Philadelphia, Pa. In this broadside folder are illustrated a number of control instruments for the boiler room and plant processes, designed to reveal instantly departures from fuel economy and deviation above or below the most efficient operating conditions.

"1935 Styles in Swimwear." The Seamless Rubber Co., New Haven, Conn. This attractive catalog beautifully illustrated in colors shows the complete line of "Pebble-Crepe" and "Gulf Stream" rubber bathing suits, a wide variety of smart caps for men and women, a rubber bathing cape, and ladies' briefs for under loose suits.

"The Story of the Tire." Fifth Edition. The Goodyear Tire & Rubber Co., Inc., Akron, O. This 47-page booklet traces rubber from the plantation and cotton from the Southland through the many respective processes to their final combination in the tire. It concisely describes and pertinently illustrates the preparation of raw materials; the manufacture of tires, tubes, and other rubber products; the means of distribution; and some of the purposes the various products serve. It is addressed to the entertainment and enlightenment of children and adults that may be interested in rubber manufacturing practice.

"Goodyear Motion Pictures." Goodyear Tire & Rubber Co., Inc., Akron, O. This is a pamphlet of 33 pages descriptively cataloging twenty-nine educational movie subjects covered with thirty-eight films. Conditions are set forth by which these films are loaned by schedule to business groups, automotive and aeronautic industries, churches, and educational institutions.

"Para Flux." The C. P. Hall Co., Akron, O. This bulletin is illustrated with 15 micro-photographs and a number of graphs showing plasticity of Para Flux stocks compared with those containing pine tar, etc. Also given are tests to determine the comparative wetting properties of Para Flux and pine tar on zinc oxide and gas black.

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The March-April, 1935, number of this publication presents a variety of original data of interest to rubber compounders including papers on "Crystallization of Sulphur from Rubber Cements," "Non-Thickening Latex Mixes," "Thermax vs. P-33 in Low-Sulphur Tube Stocks," "Effect of Vandex in Low-Sulphur Tube Stocks," "Dixie Junior—A New Clay for Rubber Compounding," "Advantages of Reogen in Carbon Black Master Batches," special compounding suggestions, and "Latex Rubber Roadways," their development in Malaya.

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STRUCTURE OF GUTTA-PERCHA STUDIED BY ELECTRON RAYS. G. Bruni and G. Natta, *India-Rubber J.,* Mar. 2, 1935, pp. 249-51. (Translation.)

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(Continued on page 84)

CLASSIFIED ADVERTISEMENTS

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SALES ASSISTANT MECHANICAL RUBBER AND TIRES. WIDE acquaintance eastern industrial plant, refineries, railroads. Capable of directing branch operation and salesmen. Address Box No. 480, care of INDIA RUBBER WORLD.

POSITION WANTED BY MAN EXPERIENCED ON SUEDE FINISH fabrics. Capable mill and calender operator. Modest salary. Available immediately. Address Box No. 482, care of INDIA RUBBER WORLD.

PRODUCTION AND PRESS ROOM FOREMAN LOOKING FOR A new connection. Experienced in molded goods, such as, heels, soles, cement applied soles, and sundries. References. Address Box No. 483, care of INDIA RUBBER WORLD.

EXPERIENCED COMPOUNDER AND CHEMIST, 10 YEARS' varied experience, principally mechanicals and dipped goods. College man. Now occupying responsible position, but desires to make change. Address Box No. 486, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER SUPERINTENDENT DESIRES TO MAKE a change. 25 years in rubberizing of all kinds of fabrics, spread or calendered. Up-to-date compounder. Expert on quarter linings, calftex, pyroxylin, etc. Address Box No. 493, care of INDIA RUBBER WORLD.

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CHEMIST: EXPERIENCED RUBBER COMPOUNDER CAPABLE OF carrying developments through both laboratory and manufacturing stages. Experience in shoe, sundries, or proof goods preferred. Address Box No. 488, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST FOR FOOTWEAR PLANT. ONE familiar with present-day methods and latest developments. Write fully stating experience and qualifications. Answer will be held strictly confidential. Address Box No. 490, care of INDIA RUBBER WORLD.

SUPERINTENDENT WANTED

We have an opening for a capable superintendent in our offset blanket department. Only those with many years of actual working experience in this particular line need apply. We offer a wonderful opportunity to someone who knows all details of the process. Give all details regarding yourself and your experience in first letter. Question of salary optional to right party. Correspondence will be held in strictest confidence. Address Box No. 491, care of INDIA RUBBER WORLD.

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Rubber Expert and Tire Technician for Product and Plant

Technical introduction of American products to British markets.

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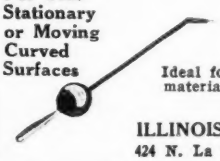
For Flat Stationary or Moving Curved Surfaces



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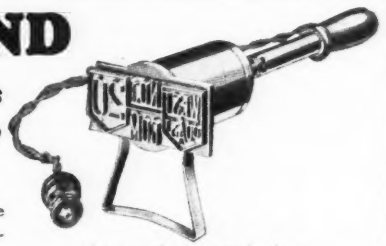

according to code regulations. Complete electric tool, $10.00. Easy to use. Guaranteed.

Also we have numbering torches for branding serial numbers and mileage on tires. More information and literature upon request.

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AKRON, OHIO

Warehouses **A. Schulman Inc.** in Both Cities

Branch Office:
576 No. 20th Street
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(*Advertisements continued on page* 83)

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	December, 1934		Nine Months Ended December, 1934	
UNMANUFACTURED	Pounds	Value	Pounds	Value
Crude rubber, etc.	6,380,712	$843,972	48,053,598	$6,091,432
Gutta percha	1,355	748	12,557	7,872
Rubber, recovered	379,300	18,454	5,163,900	231,031
Rubber, powdered, and gutta percha scrap	240,700	2,428	2,409,000	46,285
Balata	.....	.....	11,707	3,969
Rubber substitute	16,200	5,895	309,000	76,721
Totals	7,018,267	$871,497	55,959,762	$6,457,310
PARTLY MANUFACTURED				
Hard rubber sheets and rods	5,041	$2,568	15,708	$9,299
Hard rubber tubes	.....	669	.....	4,874
Rubber thread not covered	5,078	2,690	40,137	29,561
Totals	10,119	$5,927	55,845	$43,734
MANUFACTURED				
Belting	.....	$5,547	.....	$50,582
Hose	.....	4,058	.....	46,679
Packing	.....	3,603	.....	38,520
Boots and shoes.....*pairs*	223,685	96,681	849,309	350,885
Clothing, including waterproofed	.....	690	.....	16,847
Raincoats .....*number*	88	575	4,624	15,426
Gloves .....*dozen pairs*	231	821	2,905	6,625
Hot water bottles	.....	1,052	.....	16,757
Tires, bicycle.....*number*	807	398	29,209	11,579
Pneumatic .....*number*	403	4,237	13,282	146,623
Inner tubes.....*number*	104	333	2,951	6,814
Solid for automobiles and motor trucks....*number*	37	1,843	386	15,518
Other solid tires	.....	854	.....	3,840
Mats and matting	.....	6,243	.....	48,046
Cement	.....	3,763	.....	67,766
Golf balls .....*dozen*	242	865	23,267	67,617
Heels .....*pairs*	9,247	755	55,489	3,414
Other rubber manufactures	.....	57,949	.....	540,123
Totals	.....	$190,267	.....	$1,453,661
Totals, rubber imports	.....	$1,067,691	.....	$7,954,705

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$6,939	.....	$54,483	.....
MANUFACTURED				
Belting	$37,902	.....	$349,707	.....
Canvas shoes with rubber soles	40,469	.....	1,076,679	.....
Boots and shoes	151,014	.....	1,521,544	.....
Clothing, including waterproofed	5,827	.....	83,958	.....
Heels	15,861	.....	125,984	.....
Hose	10,799	.....	140,252	.....
Soles	23,738	.....	185,160	.....
Tires, bicycle	.....	.....	84	.....
Pneumatic	430,517	.....	4,652,528	.....
Inner tubes	33,461	.....	368,609	.....
Solid	.....	.....	127	.....
Other rubber manufactures	41,065	$360	488,646	$12,829
Totals	$790,653	$360	$8,993,278	$12,829
Totals, rubber exports	$797,592	$360	$9,047,761	$12,829

World Rubber Absorption—Net Imports

	Long Tons			
	1934			1935
CONSUMPTION	Oct.	Nov.	Dec.	Jan.
United States	32,052	35,234	37,074	48,162
United Kingdom	10,929	9,007	8,777	6,973
NET IMPORTS				
Australia	798	516	1,312	1,099
Austria	187	446	258	....
Belgium	693	379	168	....
Canada	3,043	1,568	2,849	2,670
Czechoslovakia	254	213	762	1,245
Denmark	188	250	282	119
Finland	86	176	102	....
France	3,424	3,176	3,605	5,573
Germany	2,148	3,425	5,207	4,286
Italy	1,296	1,764	1,896	....
Japan	7,227	5,580	3,904	....
Netherlands	447	187	139	158
Norway	40	86	72	259
Russia	3,681	4,488	*4,000	....
Spain	675	542	614	....
Sweden	499	870	687	703
Switzerland	181	159	55	80
Others	2,250	2,250	2,250	*2,500
Totals	70,098	70,316	74,013	....
Minus United States (Cons.)	32,052	35,234	37,074	48,162
Total foreign	38,046	35,082	36,939	....

*Estimate. *Compiled by Leather and Rubber Division, Department of Commerce, Washington, D. C.*

Rubber Questionnaire

Fourth Quarter, 1934*

	Long Tons			
RECLAIMED RUBBER	Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (5)	4,339	9,274	10,109	....
Manufacturers who also reclaim (29)	7,439	13,399	5,241	8,633
Other manufacturers (121)	6,932	....	....	11,915
Totals	18,710	22,673	15,350	20,548

	Long Tons		
SCRAP RUBBER	Inventory	Consumption	Due on Contracts
Reclaimers solely (5)	38,420	10,616	2,861
Manufacturers who also reclaim (17)	71,884	15,343	11,377
Other manufacturers (25)	434	....	....
Totals	110,738	25,959	14,238

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries		
All types pneumatic casings (except bicycle, airplane)	62,254	$58,893,000
All types pneumatic tubes (except bicycle, airplane)	9,578	7,248,000
Bicycle tires, including juvenile pneumatics (single tubes, casings, and tubes)	497	767,000
Airplane tires and tubes	28	56,000
Solid and cushion tires for highway transportation	261	435,000
All other solid and cushion tires	90	243,000
Tire sundries and repair materials	2,323	2,875,000
Totals	75,031	$70,517,000
Other Rubber Products		
Mechanical rubber goods	7,294	$18,910,000
Boots and shoes	4,080	12,415,000
Insulated wire and cable compounds	851	†
Druggists' sundries, medical and surgical rubber goods	727	1,944,000
Stationers' rubber goods	361	443,000
Bathing apparel	412	103,000
Miscellaneous rubber sundries	741	1,611,000
Rubber clothing	251	825,000
Automobile fabrics	277	1,192,000
Other rubberized fabrics	1,106	2,880,000
Hard rubber goods	542	2,806,000
Heels and soles	2,530	3,783,000
Rubber flooring	184	321,000
Sponge rubber	438	457,000
Sporting goods, toys, and novelties	386	1,301,000
Totals	20,180	$48,991,000
Grand totals—all products	95,211	$119,508,000

Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	215,971	16,540
Importers and dealers	87,075	32,035
Totals	303,046	48,575

*Number of rubber manufacturers that reported data was 254; crude rubber importers and dealers, 43; reclaimers (solely), 5; total daily average number of employes on basis of third week of October was 140,727.

It is estimated that the reported grand total crude rubber consumption is 92.6%; grand total sales value, 95%; the grand total crude rubber inventory 85.0%; afloat figures unavailable; the reclaimed rubber production, 100%; reclaimed consumption, 84.8%; and reclaimed inventory, 80% of the total of the entire industry.

†Due to the difficulty of securing representative sales figures this item is discontinued for 1934.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

Imports by Customs Districts

	January, 1935		January, 1934	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Colorado	.....	.....	1,450,834	$128,419
Massachusetts	6,055,532	$798,593	8,903,145	672,294
New York	71,501,886	8,724,659	84,212,910	5,853,052
Philadelphia	2,536,839	310,771	2,108,185	143,111
Maryland	1,194,817	144,007	5,556,418	331,424
Mobile	.....	.....	1,714,809	89,349
New Orleans	1,448,891	163,894	467,850	25,422
Los Angeles	7,788,043	969,517	4,755,335	334,139
San Francisco	106,459	11,879	600,567	49,319
Oregon	.....	.....	13,000	1,040
Ohio	139,523	16,571	175,129	14,608
Totals	90,771,990	$11,139,891	109,958,182	$7,642,177

*Crude rubber including latex dry rubber content.

ERNEST JACOBY & CO.

Crude Rubber
Liquid Latex
Carbon Black
Clay

Stocks of above carried at all times

BOSTON MASS.

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Why Japanese Rubber Goods are so wonderful? They're enjoying the miracle of Colloidal Whiting.

HAKUENKA

Samples on request.

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Classified Advertisements

Continued

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FOR SALE: THREE BIRMINGHAM 72" MIXING MILLS; FOUR 82" Mixing Mills; one 2-roll Calender 14 by 14" belted to motor; one Royle No. 4 Perfection Tuber; one 18 by 54" Birmingham 4-roll Calender; one unused 18 by 30" heavy duty FARREL MILL, chain drive; complete line of W. & P. Mixers, Vacuum Shelf Driers, Calenders, Mills, Colloid Mills, Pebble Mills, Dough Mixers, Hydraulic Presses, Pumps, etc. Rebuilt, guaranteed. What machinery have you for sale? CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 2 ROYLE NO. 4 STRAINERS; 1 ADAMSON 42" BY 120" hydraulic press; 2 American Process automatic continuous screw presses; vacuum shelf driers; W & P mixers, etc. ATTRACTIVELY PRICED! Send us a list of your surplus equipment. STEIN-BRILL CORPORATION, 183 Varick Street, New York, N. Y.

FOR SALE: ONE 22" BY 60" FARREL-BIRMINGHAM HEAVY duty 3-roll calender, in perfect condition, rolls never removed from packing, never been used; already dismantled and ready for removal. Allied Rubber & Proofing Co., Inc., 446 12th Street, Brooklyn, N. Y.

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AN EXCELLENT FILLER

UNIFORM SCREEN ANALYSIS

BECKER, MOORE & CO., INC.

NORTH TONAWANDA, N. Y.

MECHANICAL MOLDED RUBBER GOODS

We Solicit Your Inquiries

THE BARR RUBBER PRODUCTS COMPANY

SANDUSKY, OHIO

Genasco **(M.R.) Hydrocarbon**

(SOLID OR GRANULATED)

A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory. Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.

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Headquarters for

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MANUFACTURERS OF

Molded and Extruded Rubber Goods

Plumbers' Supplies—Gaskets & Washers

Rubber Covered Rolls

Estimates Cheerfully Furnished

OFFICE & FACTORY: 1941-51 SO. 54th AVE. CICERO, ILLINOIS

(*Advertisements continued on page* 85)

Cotton and Fabrics

(*Continued from page 76*)

a bale at one time. July went to about 11¼¢, but late in the day a recession set in, leaving prices only 12 to 20 points higher than last week's close. May ended the day at 11.09¢, July 11.12, October 10.73, and December 10.82. The local market for spot cotton was steady, 60 points advance to 11.40¢ for middling upland; sales, none.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. Market demand eased off quite unexpectedly the past four weeks. Reasons for this change are ascribed to various conditions including discussion of the processor tax in the trade press as presented by the textile manufacturers, also to the recent sharp break in cotton extending to substantially $9 a bale with subsequent recovery of about 60% of the major decline. The reaction from these conditions by consumers and jobbers has resulted on their part in marked hesitancy toward engaging for commitments pending more settled market conditions. Cloth inventories are low in the hands of manufacturers using cotton goods as raw material; so also are stocks in the hands of jobbers and cutters-up of cotton fabrics.

Gradual expansion of the market is expected as some of the questions now affecting demand and prices are cleared partly or wholly.

RAINCOAT FABRICS. Spring buying of raincoat fabrics is about to begin, and manufacturers will shortly become very busy making up new-style garments for summer trade.

SHEETINGS. The market still remains very inactive. The decline in raw cotton has made a bad situation worse in view of the fact that very little actual cotton has been offered for sale in the South. Stocks are still burdensome, and while plans have been started for 25% curtailment beginning as soon as possible for a period of 90 days, the market still remains in a very unsettled condition.

TIRE FABRICS. Demand is moderate and seasonal; while prices continue steady and unchanged.

Rubber Bibliography

(*Continued from page 80*)

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FIREPROOFING RUBBER. Flooring for Mailboats. F. Jacobs, *Rev. gén. caoutchouc*, Jan., 1935, pp. 3-10.

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Low and High New York Spot Prices

All prices in cents per pound

	March		
PLANTATIONS	1935*	1934	1933
No. 1 thin latex crepe	10⅝/12⅞	11⅞/13¼	3⅝/3⅞
No. 1 ribbed smoked sheet	10⅜/12⅛	10⅞/11⅝	2 1/16/3 1/16
PARAS			
Upriver fine	9 / 9½	9¾/10¼	6 /...

*Figured to March 25, 1935.

London Stocks, January, 1935

			Stocks, January 31		
LONDON	Landed Tons	Delivered Tons	1935 Tons	1934 Tons	1933 Tons
Plantation	12,832	3,316	81,744	38,550	36,430
Other grades	19	13	63	20	51
LIVERPOOL					
Plantation	*5,306	*1,406	*66,405	*51,702	*52,569
Total tons, London and Liverpool	18,157	4,735	148,212	90,272	89,050

* Official returns from the recognized public warehouses.

World Rubber Shipments—Net Exports

Long Tons

	1934		1935	
British Malaya	Nov.	Dec.	Jan.	Feb.
Gross exports	51,140	59,575	56,720	50,593
Imports	8,759	15,375	17,142	17,676
Net	42,381	44,200	39,578	32,917
Ceylon	6,756	9,441	5,202	*5,551
India and Burma	501	990	2,269	....
Sarawak	953	1,312	1,630	1,887
British N. Borneo	941	680	1,222	....
Siam	1,356	2,043	2,614	2,288
Java and Madura	7,621	10,865	3,812	*4,353
Sumatra E. Coast	7,123	12,953	5,371	*6,569
Other N. E. Indies	5,338	12,354	8,704	*16,885
French Indo-China	2,283	*2,956	*2,571	*2,076
Amazon Valley	1,017	1,035	*1,000	*1,000
Other America	....	....	....	....
Guayule (Mexico)	....	....	....	....
Africa	334	*300	*300	*300
Totals	76,604	99,129	74,273	....

*Estimate. *Compiled by Leather and Rubber Division, Department of Commerce, Washington, D. C.*

Rubber Goods Production Statistics

		1934	1933
TIRES AND TUBES*		Dec.	Dec.
Pneumatic casings			
Production	*thousands*	3,665	2,466
Shipments, total	*thousands*	3,015	2,825
Domestic	*thousands*	2,921	2,726
Stocks, end of month	*thousands*	9,171	7,110
Solid and cushion tires			
Production	*thousands*	16	11
Shipments, total	*thousands*	15	13
Domestic	*thousands*	14	12
Stocks, end of month	*thousands*	35	26
Inner tubes			
Production	*thousands*	3,398	2,105
Shipments, total	*thousands*	2,765	2,728
Domestic	*thousands*	2,689	2,656
Stocks, end of month	*thousands*	8,904	6,252
Raw material consumed			
Fabrics	*thous. of lbs.*	15,627	9,986
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	174	186
Rubber clothing, calendered			
Orders, net	*no. of coats and sundries*	17,059	13,818
Production	*no. of coats and sundries*	24,596	27,074
Rubber-proofed fabrics, production, total	*thous. of yds.*	3,334	1,682
Auto fabrics	*thous. of yds.*	744	306
Raincoat fabrics	*thous. of yds.*	884	628
Rubber flooring, shipments	*thous. of sq. ft.*	411	211
Rubber and canvas footwear			
Production, total	*thous. of prs.*	4,870	6,069
Tennis	*thous. of prs.*	1,570	2,436
Waterproof	*thous. of prs.*	3,300	3,633
Shipments, total	*thous. of prs.*	5,317	4,525
Tennis	*thous. of prs.*	1,258	892
Waterproof	*thous. of prs.*	4,060	3,633
Shipments, domestic, total	*thous. of prs.*	5,273	4,506
Tennis	*thous. of prs.*	1,240	887
Waterproof	*thous. of prs.*	4,033	3,619
Stocks, total, end of month	*thous. of prs.*	15,177	16,358
Tennis	*thous. of prs.*	6,999	8,265
Waterproof	*thous. of prs.*	8,178	8,093
Rubber heels			
Production	*thous. of prs.*	13,428	13,625
Shipments, total	*thous. of prs.*	14,075	12,738
Export	*thous. of prs.*	359	322
Repair trade	*thous. of prs.*	3,435	3,215
Shoe manufactures	*thous. of prs.*	10,281	9,201
Stocks, end of month	*thous. of prs.*	37,751	37,528
Rubber soles			
Production	*thous. of prs.*	3,400	4,496
Shipments, total	*thous. of prs.*	3,592	4,527
Export	*thous. of prs.*	3	3
Repair trade	*thous. of prs.*	530	281
Shoe manufactures	*thous. of prs.*	3,059	4,244
Stocks, end of month	*thous. of prs.*	4,329	4,281
Mechanical rubber goods, shipments			
Total	*thous. of dollars*	....	2,848
Belting	*thous. of dollars*	....	627
Hose	*thous. of dollars*	....	1,015
Other	*thous. of dollars*	....	1,206

*Data for 1934 are estimated to represent approximately 97% of the industry.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.